BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE

Strathcona Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective August 1, 2005

Jim Snetsinger
Chief Forester

Table of Contents

Objective of this Document 1
Description of the Strathcona Timber Supply Area 1
History of the AAC for the Strathcona TSA 2
New AAC determination 3
Information sources used in the AAC determination 3
Role and limitations of the technical information used 4
Statutory framework for AACs 5
Guiding principles for AAC determinations 5
The role of the base case 7
Base case for the Strathcona TSA 8
Consideration of Factors as Required by Section 8 of the *Forest Act* 9
Land base contributing to timber harvest 9
- general comments 9
- inoperable areas 10
- deciduous species and stands currently not considered harvestable 12
- sites with low timber productivity and sites with low timber volume 13
- environmentally sensitive areas: terrain stability 14
- archaeological sites, culturally modified trees, and cultural heritage resource values 16
- timber licence reversions 19
Existing forest inventory 19
- current inventory 19
- age and species distributions 20
- volume estimates for existing stands 21
Expected rate of growth 22
- volume estimates for regenerating stands 22
- site productivity estimates 24
- minimum harvestable ages 25
Regeneration delay and impediments to prompt regeneration 27
Not-satisfactorily-restocked and backlog areas 27
Silvicultural systems 28
Incremental silviculture 28
Utilization standards 29
Decay, waste and breakage 30
Integrated Resource management objectives 30
- cutblock adjacency, forest cover and green-up 30
- visually sensitive areas 31
- recreation 33
- karst formations 33
- community and domestic watersheds 35
- habitat for ungulates (deer, elk and goats) 35
- identified wildlife 36
- stand-level biodiversity 37
- riparian habitat 39
- landscape-level biodiversity 41
  - seral stage cover requirements 41
Second-Growth Strategy 43
Planning issues and Land Base Adjustments 43
- Central Coast Land and Resource Management Plan 43
- treaty land selections 44
- 2002 take-back from TFL 47 44

- land alienation 44
- timber reallocation project 45
Distribution of Harvest 45
First Nations 46
- consultation 46
- treaty status 47
- Forest and Range Agreements (FRAs) 47
- comments from First Nations 48
Alternative harvest flows 50
- community dependence on the forest industry 51
Minister's letter and memorandum 52
Local objectives 53
Unsalvaged losses 53
Reasons for Decision 54
Determination 59
Implementation 60
Appendix 1: Section 8 of the *Forest Act* 61
Appendix 2: Section 4 of the *Ministry of Forests Act* 62
Documents attached: 63
Appendix 3: Minister of Forests' letter of July 28, 1994 63
Appendix 4: Minister of Forests' memo of February 26, 1996 63
Appendix 5: List of written submissions received 63

Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Strathcona timber supply area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the Strathcona Timber Supply Area

Location: The Strathcona TSA is located on central Vancouver Island and adjacent areas on the mainland. The TSA covers a total area of 407 000 hectares and extends across Vancouver Island from its west coast (Nootka Sound to Brooks Peninsula) to its east coast (Fanny Bay to Sayward), and also includes islands in the Johnstone Strait and the northern Gulf Islands, as well as a large area lying between Knight and Bute Inlets on the mainland.

The Strathcona TSA is administered from the British Columbia Forests Service's (BCFS) Campbell River Forest District office. The forest district includes in its western areas the communities of Gold River, Tahsis, Zeballos and Kyuquot and, in the eastern portion, Campbell River, Courtenay, Comox, Sayward and Cumberland. The district also includes other, smaller communities, located mainly along Highway 19.

The total productive forest area in the TSA is approximately 347 000 hectares, of which less than half (160 000 hectares) is considered suitable and available for timber harvesting. The TSA comprises three timber supply blocks: the Kyuquot to the west, the Sayward to the east of Strathcona Provincial Park and the Loughborough on the mainland. A significant number of large provincial parks, including Strathcona, Tahsish-Kwois and Brooks-Nasparti are located partially or wholly within the boundaries of the TSA.

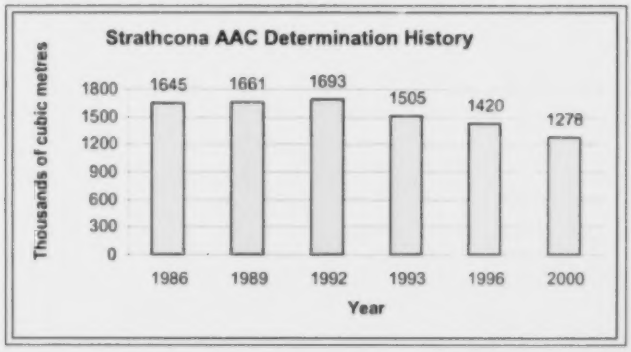
Environment: A detailed description of the environment of the TSA, including its biogeoclimatic zones, major tree species, vulnerable, threatened or endangered species, and the fish, bird and mammal species identified under the province's Identified Wildlife Management Strategy, is given in the October 2004 *Strathcona Timber Supply Area Analysis Report* ('the timber supply analysis report'). I am familiar with the environment of this TSA through this description, through my own experience in touring the area, and through discussions with district staff. In brief, the TSA consists of three biogeoclimatic zones: coastal western hemlock (CWH), mountain hemlock (MH) and alpine tundra (AT), largely in a mosaic of wet, mountainous terrain dissected by streams and rivers, many of which create estuaries as they enter the ocean. The TSA's varied topography and climate support a diverse and rich variety of wildlife. Of particular importance are the old-growth forests of the CWH zone and the protected, nutrient-rich estuaries that provide critical habitat for over-wintering water birds, many species of mammals, and young salmon. Species of particular management concern are those that rely on the characteristics of old-growth forests; as these forests are harvested and converted to younger stands, fragmentation and loss of habitat may occur.

First Nations: Fourteen First Nations, ten of which are located in the TSA, have territorial interests in the Strathcona TSA. Four treaties, representing eight First Nations, are currently

being negotiated. A number of issues raised by or of interest to First Nations are noted in the Timber Supply Analysis Report; several are addressed in appropriate sections of this rationale.

Socio-economics: A description of the socio-economic profile of the area, with which I am familiar, is provided in the 2004 timber supply analysis report. In brief, key sources of employment in the Strathcona TSA are: the public sector (including education, health, and other federal, provincial and local public services); forestry; and travel and tourism. Of the total employment in the district, forestry accounts for about 21 percent and the public sector about 34 percent. Travel and tourism-related employment—including accommodation and parts of the food, retail-trade and other sectors—account for about 15 percent of total employment. Between 1995 and 2000 the labour force in the Campbell River Forest District declined by about 5 percent. Direct employment in forestry declined by over 16 percent during that period.

History of the AAC for the Strathcona TSA



The Strathcona TSA was established in 1986 from the Quadra, Nootka, and Kingcome Public Sustained Yield Units (PSYUs). In 1986, the AAC was determined at 1 645 030 cubic metres. In 1989, the AAC was raised to 1 661 030 cubic metres and a temporary timber sale licence was issued for 16 000 cubic metres per year for deciduous stands. In 1992, to account for land withdrawn from TFL 47 and allocated to the Strathcona TSA, the AAC was increased to 1 693 745 cubic metres. In 1993, to address several large study areas under the Protected Areas Strategy, the AAC was temporarily reduced by 188 000 cubic metres under Part 15 (now Part 13) of the *Forest Act*. In January 1996, the AAC was reduced under Section 7 (now Section 8) of the *Forest Act*, by approximately 16 percent from 1 693 745 cubic metres to 1 420 000 cubic metres, including a partition of 16 000 cubic metres for harvesting predominantly deciduous stands.

Effective January 1, 2000, the AAC was reduced by 10 percent to 1 278 000 cubic metres, and the deciduous-leading partition was discontinued, based on a reasonable expectation of harvest performance within these types. This AAC is currently apportioned by the Minister of Forests and Range under Section 10 of the *Forest Act* as follows:

Form of agreement	Cubic metres	Percent of AAC
Forest licences - replaceable	920,344	72.01
Forest licences – non replaceable	92,331	7.22
Timber sales >10000 replaceable	10,926	0.86
Timber sales <=10000 replaceable	6,919	0.54
BCTS	203,801	15.95
Woodlot licences	14,040	1.10
Forest Service Reserve	29,639	2.32
Total = current AAC	**1,278,000**	**100.00**

Apportionment of the current AAC

New AAC determination

Effective August 1, 2005, the new AAC for the Strathcona TSA will be 1 217 000 cubic metres, a reduction of approximately 4.8 percent from the current AAC. This AAC volume excludes all volumes associated with woodlot licences issued to date. This AAC will remain in effect until a new AAC is determined, which must take place within five years. Please note the possibility of an earlier redetermination as discussed in 'Reasons for Decision'. This determination is exclusive of temporary reductions for proposed protected areas and treaty land selections which I will issue under a separate order under Section 173(2) of the *Forest Act*.

Information sources used in the AAC determination

The information sources considered in determining this AAC for the Strathcona TSA include but are not limited to, the following:

- *Strathcona Timber Supply Area Analysis Report*, British Columbia Forest Service (BCFS) Forest Analysis Branch, February 1999 and September 2004;
- *Strathcona Timber Supply Area Public Discussion Paper*, BCFS, September 2004;
- *Strathcona Timber Supply Area Summary of Public Input*, BCFS, January 31, 2005;
- *Biodiversity Guidebook*, Province of British Columbia, September 1995;
- *Procedures for factoring visual resources into timber supply analyses*. BC MoF, Forest Practices Branch, 1998: Victoria, B.C. REC-029;
- *Bulletin — Modelling visuals in TSR3*. BC MoF, Forest Practices Branch, 2003. Victoria, B.C.;
- *Community Watershed Guidebook*, Province of British Columbia; October 1996;
- *Incorporation of the Inventory Audit in the Strathcona TSA Timber Supply Review*, BCFS, 1996;
- *Riparian Management Area Guidebook*, Province of British Columbia, December 1995;
- Letter from the Minister of Forests to the chief forester, July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks, August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;

- Letter from the Vancouver Forest Regional Manager to licensees, May 22, 1996, providing direction on landscape-level biodiversity strategies;
- Memo from the Vancouver Forest Regional Manager, to district managers and regional team leaders, dated December 15, 1997, regarding wildlife tree patch implementation;
- *Forest Practices Code of British Columbia Act*, July 1995;
- *Forest Practices Code of British Columbia Act Regulations*, April 1995;
- *Forest Practices Code of British Columbia* Guidebooks, BCFS and MOELP;
- *Forest Practices Code Timber Supply Analysis*, February, 1996, BCFS and MOELP;
- *Forest and Range Practices Act, January 31, 2004;*
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS and the Ministry of Water, Land and Air Protection (now the Ministry of Environment, MOE)), including the AAC determination meeting held in Campbell River, February 8-9, 2005;
- Current inventory information from Resource Inventory Branch of the former Ministry of Sustainable Resource Management (MSRM) and MoF;
- Vancouver Island Land Use Plan – Higher Level Plan Order, October 24, 2000;
- Strathcona TSA Harvest Profile Review – 1996-2005;
- District staff evaluations of forest practices relating to roads, riparian areas, unstable and potentially unstable terrain, forest regeneration, and silvicultural systems;
- Paper presented at the International Mountain Logging Conference. IUFRO S3.06.00. June 2004. Vancouver, B.C.;
- Strathcona TSA cut control letters – 1997 – 2003;
- Ministry of Water, Land and Air Protection (now the MOE) Section 7 Orders:
  - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Winter Survival of Ungulate Species in the Strathcona TSA, July 27, 2004;
  - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Survival of Species at Risk in the Campbell River Forest District, July 27, 2004;
- *Guidelines for Managing Cedar for Cultural Purposes*, Coast Forest Region, January 2005;
- Sayward Landscape Unit Plan
  – *Order to Establish a Landscape Unit Plan and Objectives*; MSRM, February 2003;
  - District Manager letter *Making Scenic Areas Known and Establishing Visual Quality Objectives*, Feb 26, 2003;
  - District Manager letter making "known" the Sayward Plan document and all objectives contained within, April 17, 2003.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester, in determining AACs, to consider biophysical, social and economic information. Most of the technical information used in determinations is in the form of a timber supply analysis and its inputs of inventory and growth and yield data. These are concerned primarily with biophysical factors—such as the rate of timber growth and the definition of the land base considered available for timber harvesting—and with management practices.

The computerised analytical models currently used to assess timber supply unavoidably simplify the real world and also involve uncertainty in many of the inputs, due in part to variations in physical, biological and social conditions. While ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of these uncertainties, technical information and analytical methods alone cannot incorporate all the social, cultural and economic factors relevant to forest management decisions, nor do they necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, they do provide valuable insight into potential outcomes of different resource-use assumptions and actions—important components of the information that must be considered in AAC determinations.

In determining the AAC for the Strathcona TSA I have considered and discussed known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework for AACs

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for timber supply areas and tree farm licences. Section 8 of the Act, consolidated to December 31, 2004, is reproduced in full as Appendix 1 of this document.

Guiding principles for AAC determinations

Current forest management practices in British Columbia follow the standards and legislation set out by the *Forest Practices Code*. When the *Forest and Range Practices Act* (FRPA) becomes fully implemented, which is expected to occur by December 2006, this Act will guide forest management practices in the province. Under FRPA, forest companies must outline in forest stewardship plans how they can best achieve objectives set by government for wildlife, fish and biodiversity as well as for soils, timber, water and cultural heritage values. Government may also require results or strategies for the special management of areas of local concern, such as wildlife habitat areas, winter range for animals such as deer and mountain goats, community watersheds, fisheries-sensitive watersheds, recreation trails and scenic vistas.

Because the new regulations of the *Forest and Range Practices Act* are designed to maintain the integrity of British Columbia's forest stewardship through responsible forest practices, it is not expected that the implementation of the legislative changes will significantly affect current timber supply projections made using the Code as a basis for defining current practice.

In determining AACs in context of these provincial requirements for forest management practices and in the context of change in its many forms, I proceed under a set of stated principles as follows.

Rapid changes in social values and in the understanding and management of complex forest ecosystems mean there is always uncertainty in the information used in AAC determinations. In making the large number of periodic determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. In any specific

circumstance where I may consider it necessary to deviate from these principles, I will explain my reasoning in detail.

Two important ways of dealing with uncertainty are

(i) minimizing risk, in respect of which in making AAC determinations I consider particular uncertainties associated with the information before me and attempt to assess and address the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these AACs every five years. This principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs I attempt to reflect, as closely as possible, operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or with respect to factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the Forest Practices Code—'the Code'—which is now in transition to the Province's *Forest and Range Practices Act*.

In many areas the timber supply implications of some legislative provisions, such as those for landscape-level biodiversity, remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

As British Columbia progresses toward the completion of strategic land use plans, in some cases the eventual timber supply impacts associated with land-use decisions resulting from various regional and sub-regional planning processes remain subject to some uncertainty before formal approval by government. In determining AACs, consistent with the approach by previous chief foresters, it will be my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring for instance the establishment of resource management zones and resource management objectives and strategies for those zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. In such cases the legislated requirement for frequent AAC reviews will ensure that future determinations address ongoing plan-implementation decisions. Wherever specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base (THLB) and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although

they may contribute indirectly by providing forest cover to help in meeting other objectives, for example for biodiversity or for community watersheds.

Where appropriate, I will consider information on the types and extent of planned and implemented intensive silviculture practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of their timber supply effects.

Some interested persons have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, some AACs should be reduced immediately in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from decisions in recent years, including those in the Supreme Court of Canada. The AAC that I determine should not be construed as limiting the Crown's obligations under these decisions in any way, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Strathcona TSA. It is also independent of any decision by the Minister of Forests and Range with respect to subsequent allocation of the wood supply. I consider those aboriginal interests raised during the consultation process associated with timber supply review. As I am able, within the scope of my authority under section 8 of the *Forest Act,* I address those interests. When aboriginal interests are raised that are outside of my jurisdiction, I will endeavour to forward these interests for consideration to other decision-makers.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests and Range as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under Section 8 of the *Forest Act*, under the Code, and under the *Forest and Range Practices Act*.

The role of the base case

In considering the factors required to be addressed in AAC determinations under Section 8 of the *Forest Act*, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base

inventory, timber growth and yield, and management practices. Using this set of data and a computer model a series of timber supply forecasts is produced, reflecting different decline rates where appropriate, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From the range of forecasts produced, one is chosen in which an attempt is made to avoid both excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which any adjustments to its predictions of timber supply must be made, if necessary, to more properly reflect the current situation.

Such adjustments are made on the basis of informed judgement, using available, current information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans. Thus it is important to remember that while the timber supply analysis with which I am provided is integral to the considerations leading to the AAC determination, the AAC is not determined by calculation but by a synthesis of judgement and analysis in which numerous risks and uncertainties must be weighed. Depending upon the outcome of these considerations, the resulting AAC may or may not coincide with the base case forecast. Moreover, because some of the risks and uncertainties considered are qualitative in nature, once an AAC has been determined, further computer analysis of the combined considerations may not confirm or add precision to the AAC.

Base case for the Strathcona TSA

For the 2004 timber supply analysis for the Strathcona TSA, a spatial timber supply computer simulation model was developed, in collaboration with the Forest Analysis Branch of the B.C. Forest Service, by Dr. Andrew Fall, co-creator of the Spatially Explicit Landscape Event Simulator (SELES), a high-level language created by Fall and Fall in 1996 for the purpose of facilitating spatial and temporal modelling. The model was patterned after the Forest Service Simulator (FSSIM) used in most timber supply analyses in B.C. in recent years. The basic model has been benchmarked against the FSSIM model. The SELES model allows for the modelling of spatial relationships among areas (for example cutblock adjacency), as well as for control of the size and shape of spatial units such as harvest units and reserve areas. Using SELES, the approximate spatial location of road and riparian networks can be tracked and a simpler incorporation of other spatial data is enabled. The Strathcona base case was generated

by the SELES model using spatially implicit requirements, as in analyses using the FSSIM model.

The base case harvest forecast in the 2004 analysis incorporates current management as described in Appendix A of the timber supply analysis report and in the *TSR3 Strathcona TSA Timber Supply Analysis Data Package*.

The base case harvest forecast projects that, under current management, the current AAC of 1.278 million cubic metres could not be maintained if a timely transition to a projected mid-term harvest level of 800 000 cubic metres per year is to be achieved. The base case showed an immediate reduction to an initial harvest level of 1.117 million cubic metres per year, about 13 percent below the current AAC, followed by a reduction of about 150 000 cubic metres (roughly 12 percent of the current AAC) in each of the following two decades, reaching a mid-term harvest level of 800 000 cubic metres per year after 20 years. This level was maintained for 50 years before increasing by 14 percent t reflect the transition of the majority of the harvest into predominantly managed stands. A further increase of 6 percent, 145 years from the beginning of the projection, to a level of 970 000 cubic metres per year, reflected the expected gain in timber supply from harvesting genetically improved trees. These transitions and the supporting composition of the timber supply are explained in the timber supply analysis report.

The reduction in timber supply shown in the base case harvest forecast was roughly consistent with previous analyses shown for the TSA, with the most important factor contributing to this reduction being noted in the report as a reduction in the size of the THLB 'due in part to improved riparian habitat mapping,' which is among the factors I have considered below.

In addition to the base case forecast, I was provided with a number of sensitivity analyses and projections of alternative harvest flows carried out using the base case as a reference. These analyses and others as noted have been helpful in specific considerations and reasoning in my determination as documented in the following sections. I am satisfied that the base case, and the other analyses as noted and described, represent the best information currently available to me respecting various aspects of the projection of the timber supply in this TSA, and that as such they are suitable for reference in my considerations in this determination.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area

Land base contributing to timber harvest

- general comments

The total area on the inventory file used in preparation for the 2004 timber supply analysis for the Strathcona TSA is 1 473 151 hectares. After deducting all the TFL area outside the TSA,

all parks, all private land, all land not managed by the BCFS, all non-forest land, and all the forest land that is not considered productive, a total of 346 826 hectares of productive Crown forest in the TSA are managed by the BCFS to meet objectives for a wide range of values.

Of this productive Crown forest area, a total of 186 372 hectares are unavailable for harvesting, primarily due to being inoperable for reasons of physical inaccessibility or economic infeasibility, being on unstable or potentially unstable soils, being held in riparian areas or being important for wildlife or recreation considerations, having low productivity, or for any of the other reasons summarized in Table 5 of the 2004 timber supply analysis report.

After the deductions required for the reasons detailed in the timber supply analysis report and discussed in my considerations below, the remaining area estimated to be currently economically and biologically available for harvesting—the 'current timber harvesting land base,' or THLB—covers 160 454 hectares. This represents 10.9 percent of the total TSA land base or 46.2 percent of the productive forest managed by the BCFS.

The deductions made from the productive forest land base in deriving the THLB account for factors that effectively reduce the suitability or availability of the productive forest area for economic or ecological reasons. In the timber supply analysis, specific assumptions, and if necessary, projections, must be made about these factors, prior to quantifying the appropriate areas to be deducted, as detailed in Appendix A of the timber supply analysis report. My consideration of the deductions follows.

- inoperable areas

In the analysis, areas totalling 86 265 hectares, roughly 25 percent of the productive forest managed by the BCFS in the TSA, were considered not physically accessible for harvesting or not feasible to harvest economically. These areas were considered inoperable and were excluded from the timber harvesting land base.

The deductions were based on operability mapping completed in 1997 for the 1999 timber supply analysis. The mapping process entailed a polygon-by-polygon review of aerial photographs, correlated with field review as required. The assessment of harvest feasibility included a review of the economic attributes of forest stands (including species mix and potential quality and volume of timber), and consideration of physical accessibility factors (such as the cost of road development, helicopter flight distances, and the aggregation of merchantable volumes). To assess the probability that stands would have a reasonable expectation of harvest in current markets, these assumptions were compared with the current 'harvest profile', to allow comparison of the volumes harvested from particular species against the volumes of those species that are actually present on the THLB. Acknowledging the uncertainty introduced because only part of the harvesting between 1996 and 2005 was captured, the following results were obtained.

Species	Percentage of harvest	Percentage of THLB
Hemlock/Balsam	47	62
Redcedar/Yellow-cedar	34	14
Douglas-fir	17	22
Alder	2	2

Significantly, in the sample the percentage of hemlock/balsam in the harvest (47) is less than its percentage composition of the THLB (62), while the converse is true for cedars (34 vs.14). District staff note that during the 1997 operability mapping, hemlock prices were at historic highs and have since declined significantly such that licensees are currently depending more on the harvest of red cedar and Douglas-fir in order to sustain economically viable operations.

District staff advise that in the sample of 8833 hectares harvested between 1996 and 2005, 1168 hectares, or about 13 percent, were indeed documented as harvested from areas considered inoperable.

In public input, a group of licensees urged the postponement of this AAC determination pending preparation of new information on several factors including inventory and operability. As I have noted in my guiding principles, uncertainty will always be present in the information used in AAC determinations, and will continue to be accounted for as new information becomes available for incorporation in the statutorily-required periodic redeterminations. The five-year redetermination period for this TSA is now complete and it is likely that new inventory data and other information will not become available for a year or two, with yet a further year before a conclusive timber supply analysis, based on the new information, can be completed. My conclusion is that postponing this determination would be inconsistent with responsible stewardship, particularly when the timber supply is currently projected to decline in the near term.

Other licensees recommended updating the harvest profile, noting a recently completed 20-year plan that projects significant harvesting in areas previously deemed inoperable. One licensee questioned whether the current operability mapping recognizes helicopter access, and whether it has been compared with the licensee's own new operability assessment. A review of the operability mapping for the Kyuquot Supply Block was suggested. On the other hand, one licensee noted that the increasing costs of timber harvesting may constrain the timber supply, since some wood that has been considered accessible may in fact prove uneconomic.

District staff respond that no significant issues were flagged when the harvest profile was reviewed for the 1999 AAC determination, although significant performance was noted within areas mapped as inoperable and on potentially unstable terrain, which led the chief forester to include in his 1999 AAC determination rationale a recommendation to monitor harvesting performance over time. BCFS staff note the decline in hemlock markets, the increased dependence on cedar and Douglas-fir, and the fact that a review of the licensee's own new operability coverage shows the inclusion of areas that are not represented in the current harvest profile; these include additional areas of low-volume hemlock and cedar stands, and

stands in areas with significant terrain-related concerns. District staff note that in the licensee's operability mapping for Nootka Island, essentially all stands except for predominantly pine stands were considered operable; BCFS staff consider this beyond reasonable expectations for operability, relative to existing performance.

I recognize that licensees are currently favouring a higher proportion of cedar in their harvest. While this is understandable as a pragmatic response to the market fluctuation resulting from the reduced international demand for hemlock, in my judgement it does not provide a sufficient reason to conclude that the general physical assessment of operability in the TSA is in error. An operability line can only provide a relatively coarse approximation of our expectations as to which stands will ultimately prove economically desirable to harvest in unpredictable markets. In my experience it is usually the case that some stands considered to be inoperable may prove operable under favourable conditions and will be harvested and, conversely, some considered to be within the operable area may in fact prove uneconomic and will not be harvested. Complicating any decision on the possible need for a broad reassessment of operability is the fact that while it is relatively easy to document instances where stands considered inoperable have been harvested, it is less straightforward to document instances where harvesting has been and continues to be avoided in stands that are mapped as operable.

The traditional way to minimise uncertainty in operability mapping is to monitor harvesting performance over a business cycle of ten years or so, to iron out performance anomalies induced by changes in markets. If the current proportional underutilisation of hemlock stands on the THLB were to continue indefinitely, at some point this would become a cause for concern that the general operability line in the TSA ought to be reviewed. For this reason, in my 'Implementation' section I have recommended continuing the monitoring of the harvest profile in the TSA, with a view to providing more comprehensive information for use in the next determination.

In the meantime, I note that performance is being shown outside the operability line, including in cedar stands, and that this is resulting in incremental additions to operability, as all stands with logging histories are included in the operable area. However, no specific stand characteristic has been identified as indicative of the appropriateness of including all of a particular type of presently excluded stand, and I do not have sufficient information to conclude that the current, general operability mapping is either an over- or an under-estimation of the general level of economic viability of stands for harvest in the TSA. Acknowledging this uncertainty, I am satisfied, from the method by which the operability information was generated, that the assumptions incorporated in the base case in this respect represent a reasonable estimate of the range of operability in the TSA, and are acceptable for use in this determination. I have discussed related issues under *terrain stability*, below.

- deciduous species and stands currently not considered harvestable

In the Strathcona TSA, all pine stands and all predominantly deciduous stands except alder are considered unmerchantable. Alder stands are also currently considered unmerchantable in the Kyuquot supply block of the TSA.

In deriving the THLB for the timber supply analysis, these unmerchantable stands were entirely excluded. In the Sayward and Loughborough Supply Blocks, on the east coast of the TSA, alder-leading stands were assumed to be harvestable up to 80 years of age, then designated as unharvestable once they passed this age, as most such stands over 80 years old begin to decline and then rapidly become unmerchantable. A deciduous forest licence for 8000 cubic metres in the TSA relies mainly on the remaining alder in the Sayward Supply Block. Significant volumes of alder in the nearby Loughborough block do contribute to harvest flow projections but are more widely dispersed and in more difficult operating areas.

A total of 1913 hectares were removed specifically to account for unmerchantable species. In view of the additional assumption that alder stands beyond 80 years of age will no longer contribute to the timber supply, I conclude that the base case projection has adequately accounted for these species, including the commercially viable component of the deciduous forest in the TSA.

- sites with low timber productivity and sites with low timber volume

Some treed areas are not assumed to contribute to timber supply because their low timber productivity is expected to prevent their producing a merchantable stand in a reasonable time. This may be due to factors inherent in the growing site—such as a poor availability of nutrients, a disadvantageous exposure, or the presence of excessive moisture—or because the site is not fully occupied by commercial tree species.

In deriving the THLB for the 2004 timber supply analysis, a total of 9404 hectares were excluded specifically to account for sites with volumes of less than 350 cubic metres per hectare and for sites with site indices that would not permit their achieving this volume.

In public input, one licensee inquired whether logging has occurred on any site excluded for low productivity in the 1999 analysis, whether the classification of such areas would be affected by revised higher site indices and what area or volume would be affected if the BCFS were to view cedar stands more optimistically. BCFS staff advise that for the purposes of the analysis, all sites with a history of harvesting, including any previously excluded for low site-productivity, were in any case included in the THLB.

I consider the exclusion of stands with productivities at or about the levels identified in the analysis to be appropriate and necessary. I also consider the inclusion of those sites with a history of harvesting operations as a legitimate attempt to account for some of the uncertainty present. The volume of 350 cubic metres per hectare represents the threshold below which only limited harvesting performance has been observed in old-growth stands in this district. Some lower-site cedar stands may indeed be suitable for logging, but can only be reasonably represented as such in the THLB when reflected in harvest performance.

I have reviewed with BCFS staff the criteria and characteristics applied in the land-base exclusions and I am satisfied that low-site deductions as applied in the timber supply analysis reasonably represent current practice. I therefore find them appropriate for use in this determination.

- environmentally sensitive areas: terrain stability

The Strathcona TSA includes significant areas where productive forests occur on sensitive soils, where the terrain is unstable or potentially unstable. The Forest Practices Code permits harvesting with due care on some of these areas.

In deriving the THLB for the timber supply analysis, these sensitive areas were partially excluded, and partially included, to reflect current operational practice. The actual extent to which these areas may reasonably be expected to contribute to the timber supply is subject to uncertainty in several respects including the extent to which operations may be undertaken in an environmentally appropriate way on slopes of varying steepness.

To assess terrain stability at a fairly coarse level, between 1992 and 1998 reconnaissance mapping was carried out at a scale of 1:50 000 by a qualified registered professional geoscientist for the whole TSA. On completion, this mapping was reviewed and accepted by BCFS district staff, and was used in the 1999 timber supply analysis. From the mapping, the geoscientist leading the project developed land base exclusions for various mapped classes of sensitive soils. The percentage land base reductions that were applied to particular classes of sensitive soils are outlined in Table A-7 of the 2004 timber supply analysis report. BCFS district staff consider these reductions to accurately reflect current management.

In the analysis it was assumed, for analytical expedience, that that forest stands on potentially unstable terrain slopes greater than 30 degrees would be completely unavailable for harvest, and that 95 percent of stands on slopes of less than 30 degrees, where a component of the stand was in the timber harvesting land base, would be completely harvestable. The 30 degree threshold was derived as a result of examining the profile of current not-satisfactorily-restocked (NSR) area where it was found that about 65 per cent of harvesting in the past few years has occurred in stands below 30 degrees.

In public input, one licensee expressed concerns about the large land base exclusions for potentially unstable terrain, inquiring about applicable harvest profile data and the possibility of incorporating class-5 terrain mapping completed for the Tahsish/Artlish portions of this TSA. One First Nation recommended a precautionary approach when managing terrain prone to landslides, given the potential for impacts to watersheds and fish habitat, and I have noted in several places in this rationale my concern that any harvesting on potentially unstable terrain should be carried out in an environmentally sound manner.

BCFS district staff respond that they have created a recent harvesting map layer that was intersected with the same slope information used when the NSR was assessed. Again, it was found that most of the recent harvesting has occurred on slopes below 30 degrees.

The district staff note that while there is some harvesting performance on slopes between 30 and 40 degrees, assessing the likelihood that these operations can continue would require more information than is currently available.

A sensitivity analysis was carried out to examine the harvest flow implications of including forest stands of at least 500 cubic metres per hectare on potentially unstable terrain on slopes of between 30 and 40 degrees. This added approximately 20 000 hectares, or 13 percent, to the timber harvesting land base. The result was a forecast with a starting harvest level of 1.155 million cubic metres per year, 3 percent higher than the base case, declining in smaller

steps than the base case to a mid-term level of 930 000 cubic metres (16 percent higher than the 800 000 in the base case) before rising in 145 years to a long-term level of 1.07 million cubic metres (compared to 970 000 in the base case).

The information provided by this analysis indicates the potential for significant increases in the timber supply, to the extent that harvesting is physically, environmentally and economically possible on portions of slopes with potentially unstable terrain with the indicated degree of steepness. However, a number of cautions must be applied.

First, is not at all clear how reliably the harvest performance on potentially unstable terrain to date indicates the extent of any harvest opportunity in old-growth stands remaining on potentially unstable terrain. BCFS district staff recently discussed this matter in detail with the regional geomorphologist. They concluded that, while there is evidently some harvest performance on areas steeper than 30 degrees, at least some of this may occur on small, flatter areas that are included in larger terrain units that nevertheless have an overall average steepness of over 30 degrees. They note that in general, terrain polygons are broadly mapped to include a range of slopes, while the slope information used in the SELES analysis was based on much smaller, one-hectare pixels. This would have led, in the sensitivity analysis, to the inclusion in the THLB of many, less-steep, smaller, harvestable areas within terrain units that are steeper and less harvestable overall, inflating the assumed contribution of practicable harvesting from much of these steeper slopes.

Second, from my personal experience in reviewing a considerable number of slope failures in westerly portions of the TSA, both in areas where harvesting has taken place and in areas where the terrain has given way in natural slides, it seems reasonable to assume that there will be many areas where harvesting may be physically and economically feasible, but environmentally inadvisable. This is corroborated by a recent study (a paper presented at the International Mountain Logging Conference, IUFRO S3.06.00, June 2004,Vancouver, B.C.) correlating the incidence of harvest-related landslides in the Klanawa River area of TFL 46 with average slope class; a significant increase was found in the rate of harvesting-related landslides, on similar topography, as slopes exceeded 30 degrees.

From the harvest profile analysis, and from extensive discussions with BCFS district staff and the timber supply analyst, I am satisfied that there may be a somewhat greater potential for harvesting on potentially unstable terrain on slopes greater than 30 degrees than was assumed in the base case, in which all such slopes were completely excluded. However, without more detailed information demonstrating the successful and environmentally appropriate harvest of a significant proportion of such slopes, at this time I am not convinced of any underestimation in the timber supply in the base case on this account. If licensees can assemble and demonstrate adequate, specific evidence of successful operations to an extent that verifies such an underestimation, this can be taken into account in the next determination. For the current determination I am satisfied that the degree of uncertainty associated with this factor does not of itself present a significant risk to the validity of the base case projection.

- existing and future roads, trails and landings

In the timber supply analysis, separate estimates were made to reflect the losses to the productive forest already incurred by existing roads trails and landings, and losses to be expected in the future.

For existing, unclassified roads, land-base exclusions were derived using the Terrain Resource Information Mapping (TRIM) for the forest district. Roads were assumed to require a total width of 15 metres, including an allowance for unmapped trails and landings. A total area of 10 060 hectares were identified. In the series of exclusions in the timber supply analysis, parts of this total area were already excluded for other reasons, leaving a net reduction to the timber harvesting land base, for existing roads, trails and landings, of 8243 hectares.

For future roads, based on current management practices and harvest history in the forest district, in the analysis it was assumed roads would be needed to reach any stand older than 86 years of age and further than 200 metres from an existing road. The reduction required for such roads was assumed to be 5 percent of the associated productive forest for conventional harvesting. For helicopter harvesting, to simplify modelling in view of the relatively small area involved—and not in anticipation of an actual change in requirements—the deduction was changed (with no impact on the timber supply) from the 0.5 percent figure in the data package to 1 percent in the analysis. For conventional and helicopter harvesting combined, the estimated reduction for future roads was 776 hectares.

Since completion of the analysis report, district staff have reviewed the assumed width of 15 metres for existing roads and now consider that an allowance of 12 to 13 metres would be more appropriate.

In public input, a licensee questioned the use of silviculture prescriptions to estimate future roads, suggesting this may overestimate the requirement, and recommending the use of 'NPUNN' data from the Integrated Silviculture Information System (MLSIS) as used for current roads. BCFS staff respond that the data reported in MLSIS for conventional and aerial logging combined averaged 4.7 percent of productive forest during the period 1995-2000; the difference from the 5 percent figure used was not considered significant and no change was made. For comparison, in the 1999 analysis, existing roads were modelled at 5 percent, and future roads—with no consideration of proximity to existing roads—at a higher figure of 6 percent for conventional harvesting, and at 0.5 percent for helicopter harvesting.

District staff indicate from their review that the actual productive area lost to existing roads may be somewhat less than was modelled in the base case, such that the THLB may have been slightly underestimated. The trees growing on this excluded area will contribute to the timber supply when they become ready for harvesting in the mid term. In my determination I have therefore accounted for a small underestimation, likely less than one percent, in the mid-term harvest level projected in the base case, as discussed further in 'Reasons for Decision'.

- archaeological sites, culturally modified trees, and cultural heritage resource values

Archaeological sites, and culturally modified trees (CMT)s that predate 1846, are protected under the *Heritage Conservation Act*. In the Strathcona TSA, archaeological resource values relate primarily to First Nations' historic village sites, shell middens, and CMTs. Historic

village sites and shell middens are usually identified near marine shorelines, and CMTs are generally found in remaining old-growth forest, most often in stands of predominantly red or yellow cedar; these are located primarily in the Kyuquot Supply Block and to a lesser extent in the Loughborough Supply Block, with identified CMTs following a similar distribution. The Archaeology and Registry Services Branch of the former Ministry of Sustainable Resource Management (MSRM) generally recommends preserving CMTs where possible.

Archaeological Overview Assessments (AOAs) have been completed for the Kyuquot and Loughborough Supply Blocks, but not yet for the Sayward Supply Block on the east coast of Vancouver Island. Three years' work have been completed on an Archaeological Inventory Study in the Kyuquot sound area in cooperation with the Kyuquot/Checlesaht First Nation, but the multi-year project is on hold at the time of this determination, pending funding from the provincial Forest Investment Account (FIA). Initial results indicate the existing Northern Nuu-chah-nulth AOA may under-represent the density and extent of CMT resources in the Kyuquot Sound area.

An AOA informs land managers where further work on archaeological assessment may be required; this information may not be conclusive but it does provide valuable indications as to the likelihood of finding archaeological resources in a given area. In general, where an AOA predicts a high or moderate potential of finding archaeological resources, licensees should consider conducting an archaeological reconnaissance study, an Archaeological Impact Assessment, or a CMT survey. If field assessments reveal evidence of habitation, CMTs, or resource use including hunting, these are identified and are catalogued in a provincial government database of 'Remote Access to Archaeological Data' (RAAD).

For the 2004 timber supply analysis, the RAAD database was used to identify locations where archaeological resources, including CMTs, had been formally catalogued. For large areas which could be mapped as polygons, the entire polygon was assumed not to contribute to the timber harvesting land base, and for very small features, one hectare of land was excluded at the appropriate location. This resulted in a total land base exclusion (after deductions for any other reasons) of 515 hectares, specifically for archaeological sites.

I am advised that district staff are aware of areas of significant CMT concentrations that have not been formally catalogued in the RAAD database. This results from the range of strategies employed by forest licensees in managing archaeological resources.

In the Campbell River Forest District, the continuation of access by First Nations to western redcedar and yellow cedar, which has contributed importantly to their history, has been communicated as of high importance to the maintenance of their culture and tradition in the future. Coast Forest Region staff, working with holders of Forest Licences, have recently produced the document *Guidelines for Managing Cedar for Cultural Purposes*, January 2005. Access by First Nations to cedar for cultural purposes is an important resource management consideration, and this document will provide guidance on suitable approaches for meeting such needs for cedar, where such an interest has been expressed.

Traditional Use Studies performed over the past 20 years, often funded by licensees and government through Forest Renewal BC and the FIA, have attempted to assess histories of traditional aboriginal uses, either for traditional territories asserted by First Nations, or for large drainage basins. Although fewer such studies are now undertaken due to funding

constraints, their correlation with mapping information can permit identification of areas where cultural heritage resource values may be important forest management considerations. As inventories and information on cultural heritage resources are incomplete and in some cases not made available to licensees or government, there is uncertainty in assessing the overall impacts of such values on timber supply.

In public input, forest licensees observed that the data package did not mention archaeology as a management consideration; however, as noted above, the RAAD database was in fact taken into account. First Nations pointed out that some CMTs left standing eventually blow down, as in the Amai Inlet, and inquired whether the economic value of these trees could be assessed such that they could then be harvested and their value conveyed to the First Nation. However, Section 8 of the *Forest Act* does not provide the chief forester with a mandate to consider the apportionment of timber or the disposition of funds realized from its harvest. Other comments received were that the THLB should exclude First Nations' reserves, which it does, and that it should reflect known archaeological values, which is also the case.

In reviewing the adequacy of the incorporation in the base case of archaeological and cultural values as well as CMTs, I am left with two concerns. First, while some allowance was made in the current analysis for archaeological features, current practice shows that in areas with a significant presence or likelihood of CMTs, a range of management alternatives is being pursued: some CMT areas are being wholly or partially incorporated in additional wildlife tree patches; some are being retained through selection logging; for some, block boundaries are being adjusted; and others are accommodated by avoidance of harvesting altogether. Since district staff are aware of significant CMT concentrations that are not formally catalogued in the RAAD database, and since the full distribution of these areas on the land base is unknown, it appears likely that further avoidance of CMTs on the THLB may have a negative but presently unquantifiable impact on timber supply. As I have noted in the 'Implementation' section, I encourage licensees and district staff to work cooperatively to resolve and quantify as well as possible, for the next analysis, a more refined estimate of the impact on timber supply to be expected from managing CMTs.

My second concern is for the certainty of First Nations' access, particularly in the long term, to cedar for traditional and cultural purposes. The Coast Region's Guidelines indicate the need for such provision, but an associated management strategy is not yet developed. District staff indicate that the current demand for cedar for traditional and cultural uses can likely be met, but are uncertain whether, without additional provision, cedar trees of adequate size and quality will be available over the long-term to meet First Nations' needs, or what the requirements of a related management strategy will be. In this situation, I consider it appropriate to recognize the risk of an associated potential impact on timber supply.

In my 'Reasons for Decision', I have further discussed the implications of the potential but unquantifiable overestimations in the base case projection resulting from the need for a more complete accounting for CMTs, and from the need to provide ongoing access by First Nations to cedar for cultural purposes. The latter is also noted below under *minimum harvestable ages*.

- woodlot licences

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to woodlot licences. When woodlot licences are issued from a TSA, the required volumes are first allocated from an appropriate apportionment under the AAC for the TSA. Then, in the next AAC determination for the TSA, the TSA land base is reduced by the area of Crown land in all the woodlot licences issued since the previous determination, and the total volume in the issued woodlot licences is excluded from contributing to the AAC for the TSA. All Schedule B lands associated with woodlot licences issued from the Strathcona TSA since the 1999 AAC determination have been excluded from the Crown forested land base of the TSA and made no contribution to the timber supply projected in the base case. I am therefore satisfied that the base case projection accounts appropriately for all woodlot licence areas.

- timber licence reversions

Timber licences (TLs) are old tenure arrangements that give a licensee exclusive rights to harvest merchantable timber within the TL area. Until harvested, the volumes in TLs do not contribute to AAC for the TSA. However, once a TL has been harvested, and the area has been regenerated and the trees have attained free-growing status, all future harvesting rights from the licence area revert to BCFS jurisdiction, and all associated harvests contribute to the timber supply and to the AAC for the TSA.

In the Strathcona TSA, areas coded as TLs currently cover about 17 600 hectares of the timber harvesting land base. In the timber supply analysis, these areas were included in the THLB only after their first harvest, from which point they were assumed to contribute to the mid- and long-term timber supply. To date, roughly 12 600 hectares of forest aged up to 105 years of age have already reverted from TLs in the TSA and thus have been included in the timber harvesting land base. Approximately another 5000 hectares of TLs in the TSA remain and will eventually revert to BCFS jurisdiction. In the analysis, these areas were assumed to be harvested and reverted to Crown jurisdiction at a rate of 500 hectares per year, and were assigned to regenerated analysis units consistent with the existing forest cover. These stands are expected to be harvested in the next ten years.

I consider the assumption applied in the analysis to be a reasonable means of incorporating the uncertainty in the reversion schedule, and I see no need to adjust the base case projection on this account.

Existing forest inventory

- current inventory

As noted in the 2004 timber supply analysis, the forest inventory used in the analysis was assembled in two projects. The data for the Kyuquot supply block was completed in 1987, and the data collected for the Sayward and Loughborough supply blocks was completed in 1991. Using satellite imagery, the data was updated to reflect depletions that have occurred since the last inventory update. Operability mapping was updated by the forest district staff using information supplied by a consortium of licensees and an internal review of harvest

performance in areas previously deemed inoperable. Reconnaissance level terrain stability mapping was completed for the entire TSA over a period between 1992 and 1998. This mapping delineates areas of unstable and potentially unstable terrain. Wildlife habitat mapping, including ungulate winter range and bald eagle shoreline nesting area, was initially completed in the 1970s and last updated in 1992. Recreation and visual landscape inventories were completed over the period of 1991 to 1995. In 1998, the visual landscape inventory was updated to correct digitization errors. Areas with karst features are identified on the recreation features inventory. The RAAD database was used to identify locations where archaeological resources, including CMTs, had been formally catalogued.

Landscape unit boundaries were delineated in 1997 as part of the Vancouver Region Landscape Unit Planning Strategy. In November 2000, resource management zones were created on Vancouver Island as part of the Vancouver Island Land Use Plan (VILUP). Specific resource management objectives and strategies are applied to these zones. In April 2001, the British Columbia Government endorsed Phase 1 of the Central Coast Land and Resources Management Plan (CCLRMP), termed a Framework Agreement. The agreement included a negotiated map delineating new proposed protection areas, option areas, First Nations lead areas and special management zones.

From discussions with BCFS staff I am satisfied that the inventory file used for the analysis was updated adequately to incorporate the necessary depletions, planting and silviculture, that it is the best information currently available and that it is suitable for use in this determination.

Since the inventory was updated by satellite imagery to 2001, that year essentially represents year zero of the timber supply forecast in the base case. That is, 2005 corresponds to year four of the first decade in the projection, leaving a further six years of the first decade projected at the initial harvest level. In the absence of other considerations, a harvest level set at the initial harvest level projected in the base case could therefore be maintained for one year more than the five-year effective period of the AAC I am now determining. For this reason the date of the projection does not of itself imply an overestimation in the viability of the base case forecast over the next five years.

It must be noted, however, that during the first four years of the projection, the inventory was being depleted not at the rate implied by the initial harvest level in the base case (1.12 million cubic metres per year) but at a rate determined by the actual harvest achieved under the existing AAC of 1.278 million cubic metres. In fact, the actual level of harvest in the TSA has been lower than the existing AAC in recent years, such that there is now an accumulated undercut of 360 000 cubic metres. I have considered the implications of this situation in my determination as noted in 'Reasons for Decision'.

- age and species distributions

The THLB is dominated (62 percent) by stands of hemlock and balsam (true fir), with smaller amounts of Douglas-fir (22 percent), cedar (14 percent), alder (2 percent) and spruce (1 percent).

On the timber harvesting land base, only about 19 percent of the area is above 125 years of age and about 68 percent is below 60 years of age. This signifies an inevitable and substantial shift in the near future from harvesting in older stands to harvesting in younger stands. This

transition is a key underlying feature of the timber supply projection for the TSA. Just about 32 percent of the area of the THLB currently supports timber above minimum harvest criteria, and of this area, roughly 38 percent consists of second-growth stands. Some stands older than 125 years have still not attained the minimum harvest criteria. The availability of growing stock above the minimum harvest criteria will become most limiting on the timber supply about 50 years from now, and I have remained mindful of this condition in my determination.

- volume estimates for existing stands

In the 2004 timber supply analysis, estimates of timber volumes for existing natural stands were produced by the variable density yield projection (VDYP) model, version 6.6, developed and supported by Forest Analysis and Inventory Branch of the MOFR. In this analysis, in contrast to the common practice of aggregating yield tables to simplify the dataset, no simplifications were made other than directing stands with identical attributes (i.e. stand age, crown closure, site productivity, forest inventory zone, etc.) to the same yield table.

The results of an inventory audit, completed in March 1999, addressing uncertainties in the estimates projected for volumes in existing natural stands in the Strathcona TSA, were assessed by staff of the former MSRM (and included in the 2004 timber supply analysis in that report's appendix, Tables A-21 and A-22). The information shows that the only forest stands where ground estimates were statistically different from the heights and volumes in the inventory were stands above 140 years of age on the east side of the TSA, in the Sayward and Loughborough supply blocks. Based on a relatively small sample size, these stands were assessed to have been overestimated (in the inventory used as part of the basis for projecting the base case timber supply forecast) by about 8.5 metres, while the associated volumes were overestimated by, on average, 30 percent.

In order to determine the implications of these overestimations for the projected timber supply, a sensitivity analysis was performed (Figure 23 in the analysis report) in which a reduction of 30 percent was applied to the volume estimates for the appropriate stands. This reduced the total initial inventory on the THLB by 1.4 million cubic metres, or about three percent, resulting in an average reduction in the projected timber supply of just over 28 000 cubic metres per year in the short term and into the mid term.

In public input, licensees noted the expected completion of Phase two of the new VRI inventory with NVAF destructive sampling in 2005-2006, and the likelihood of the availability of new information roughly a year from now. This was a contributing reason for licensees' suggestion to postpone this AAC determination, to which I have already responded. One licensee noted the substantial amount of timber in the 20-to-60-year age class and the likelihood that the new inventory will identify higher site indices than currently assigned, notably for young hemlock stands.

I agree that new inventory information for the TSA will be available in the near future, and may be adequately analysed in a few years. I also agree that if results are consistent with findings in other parts of the province, the volumes projected for existing young stands below 60 years of age are likely to be higher than predicted by the VDYP model. This could have near-term implications as logging of stands aged 60 years or so becomes more common in the Sayward area. However, while acknowledging the provincial trend, I do not at this time have

any new inventory figures or definitively higher site indices specific to the Strathcona TSA from which to interpret these implications as potentially quantifiable underestimations in the base case projection. On the other hand, the statistically significant results of the 1999 inventory audit do indicate—particularly in context of a currently declining timber supply—the need for me to place weight on and account for a quantifiable overestimation of 28 000 cubic metres per year in the base case projection, and I have taken this into account in my 'Reasons for Decision'.

If new inventory information does indicate the potential for a substantial upward revision in the projected timber supply in the short term, I will be prepared if necessary to revisit this AAC determination at an earlier date than required by statute. In that respect, I would like to invite and encourage licensees, as they proceed to take a lead role in future timber supply analyses under the Defined Forest Area Management (DFAM) process, to maintain integrated communication with the Forest Service at all stages of the process. The BCFS will be required to provide a professional review and validation of the results of the analysis, prior to a determination of an AAC by the province's Chief Forester. I believe an ongoing, cooperative working relationship between appropriate staff from licensees and from the BCFS will benefit both the efficiency and the efficacy of this review, leading to an optimal basis for the AAC determination.

Expected rate of growth

- volume estimates for regenerating stands

In the 2004 timber supply analysis for the Strathcona TSA, estimates for growth and yield for existing and future managed stands were obtained using WinTIPSY (the Windows™ version of the Table Interpolation Program for Stand Yields, version 3.2, supported by the BC Ministry of Forests and Range's Research Branch). Volume predictions using TIPSY are based on the management of stocking density, full site occupancy and the absence of significant brush competition. The TIPSY projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition. However, certain operational conditions, such as a less-than-ideal distribution of trees, the presence of small non-productive areas, endemic pests and diseases, or age-dependent factors such as decay, waste and breakage, may cause yields to be reduced over time. Two operational adjustment factors (OAFs) are therefore applied to yields generated using TIPSY, to account for losses of timber volume resulting from these operational conditions. OAF 1 is designed to account for factors affecting the yield curve across all ages, such as small stand openings, and OAF 2, for factors whose impacts tend to increase over time and whose influence on a stand may be reduced through management practices—such as decay, waste and breakage. In the 2004 analysis, the standard default provincial modelling reductions of 15 percent for OAF1 and 5 percent for OAF2 were applied to all regenerating stands except dry Douglas-fir sites which are discussed below, under Unsalvaged Losses.

Data from the Tree Improvement Branch of the Ministry of Forests and Range show that Class A seed has been employed in cedar, fir and some hemlock stands in the Strathcona TSA. I have reviewed the tabulated genetic gains assumed for each year from 1993 to 2002, as well as the percentage of Class A seed among planted seedlings for those years. The percentages

increased significantly until, in 2002, Class A seed comprised 100 percent of all planted hemlock and Douglas-fir, and 69 percent of all planted cedar.

I am advised that only one licensee commonly plants hemlock in the TSA at the present time, and that ingress of natural reforestation from seed from trees adjacent to cutblocks is widespread. Moreover, Class A seed is not continuously available for planting at all times, and even in some instances where cedar is planted for example, a naturally regenerating hemlock forest may under certain circumstances overtake some of the planted cedar. For these reasons the volume gains inherent in Class A seedlings may only properly be applied to specific areas, rather than to the whole of the regenerating land base.

Consequently, in projecting the base case forecast, assumptions were required to be made about the extent of the use of Class A seed, as described in the timber supply analysis. The assumptions led to the assigning of volume gains to about 6700 hectares on the THLB at the start of the analysis, based on the genetic gain information available up to 2002, the year to which all stand yields were projected.

The potential for genetic gain has been identified for four seed planning units covering about 59 percent or 95 000 hectares of the timber harvesting land base, with higher projected volume gains starting in 2006. A sensitivity analysis was performed to examine the implications for timber supply if the projections starting in 2006 actually occur. This analysis showed an increase of about three percent in the long-term harvest level, to one million cubic metres per year, beginning about 145 years from now.

In public input, a licensee questioned why the harvest of genetically improved stock does not start for 145 years. In fact, the harvest of improved stock does begin much earlier, and does begin affecting the total volume contributing to the timber supply much earlier. However, for the reasons noted above, not all stands in the seed planning units will experience genetic gains, and when harvest flow considerations are also accounted for, to avoid unacceptable fluctuations in projected harvest levels, it is not until 145 years from now that sufficient additional volume will have accumulated to be reflected in the projection as a significant and durable increase in the harvest level, directly attributable to genetic gain.

Also in public input, a licensee suggested that the OAFs are probably overestimated. This would imply an underestimation to some extent in the timber supply. I am advised that this issue has been raised before, but that no supporting data has been provided. Without supporting local data, anecdotal suggestions do not provide an adequate basis from which to apply upward adjustments to timber supply projections, especially when the harvest level is projected to decline in the near term.

In the DFAM process, licensees will soon take the lead in collecting, assembling and analysing data in support of reviews of the timber supply. Given the intricacies and complexities of timber supply projection, it will be expedient for licensees to work cooperatively with BCFS staff to identify and prioritize areas of work with the greatest likelihood of improving information or reducing uncertainties that may lead to improving the timber supply in ways that are verifiable upon review.

For the current determination, from my review of the methods of projecting regenerated stand volumes, including the assumptions applied with respect to genetic gains, I am satisfied that

the base case accounts adequately for expected rates of growth in the regenerating, managed stands in the TSA.

- site productivity estimates

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on the height of a stand as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which the stand will satisfy mature forest cover requirements and reach a merchantable size.

In general, forest stands between 30 and 150 years of age provide the most accurate measurement of site productivity. Site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where old-growth site index (OGSI) studies suggest that actual site indices may be higher than those indicated by existing data from mature forests.

A terrestrial ecosystem mapping (TEM) project has been recently completed for roughly 60 percent of the Strathcona TSA, mainly within the Kyuquot and Sayward supply blocks. The TEM information was reviewed and accepted by BCFS staff in 2004, and was merged with site indices for 2003 biogeoclimatic ecosystem classifications provided by the BCFS Research Branch, to create 'SIBEC' estimates of potential productivity for the TSA. The new data, assigned to about 88 000 hectares of the timber harvesting land base, increased the average site index on affected stands from about 22.5 metres to 25 metres.

When the SIBEC figures were applied in sensitivity analyses (at first only to new stands as they become harvested in future, and then both to those new stands and to all existing stands aged 20 years and younger, as shown in Figure 14 in the timber supply analysis report), the average age of trees harvested declined by about 10 years. After 85 years the average volume of timber in stands had increased by about 4 percent, to about 675 cubic metres per hectare, supporting a mid-term harvest level of 1.12 million cubic metres per year. The area projected to be harvested annually in the long term also increased by about 15 percent, supporting a harvest level of 1.13 million cubic metres annually, about 160 000 cubic metres higher than in the base case projection.

In a third sensitivity analysis, when the average site productivity change for managed stands in each analysis unit within the area covered by the TEM was extrapolated in the model to the unmapped portion of the TSA, and when this relationship was applied to new stands after the first harvest in the model, the harvest level increased to 1.12 million cubic metres after 70 years, followed by an increase to 1.25 million cubic metres in 125 years' time. In the long term, the average harvested age was projected to be roughly 85 years, and the area harvested annually increased by 20 percent.

In public input, licensees observed that if the adjustments to the site productivity estimates were not applied in the sensitivity analysis to stands between 20 and 60 years of age, the results likely underestimated the potential increase in timber supply. This may be valid to some extent but many of these stands will already have had adjustments from their original old-growth site indices through regular inventory procedures that assign mid-point site indices based on ground-based productivity classes. Without data to support the applicability of TEM and SIBEC values to all ages and in all areas, the results of such analysis would be speculative. As noted earlier, licensees in the TSA are working to complete a new Vegetation Resources Inventory prior to the next timber supply review, which will assign new site indices to these younger stands.

For the current determination, I accept that the sensitivity analyses incorporating the productivity values based on data from the TEM and SIBEC estimates as applied to the mapped area only, provide improved, more current projections of the timber supply than the base case, which did not incorporate this data. This indicates a probable underestimation of 160 000 cubic metres per year in the long-term harvest level projected in the base case forecast, and I have considered the potential for an addition to the long-term supply on this account in my determination as discussed in 'Reasons for Decision'.

- minimum harvestable ages

The minimum harvestable ages used in timber supply analysis are estimates of the earliest age at which a forest stand will have grown to a harvestable condition. Minimum harvestable ages affect when second-growth stands will become available for harvest, which in turn affects how quickly existing stands may be harvested while maintaining a stable flow of harvestable timber. In practice, economic considerations and constraints on harvesting that arise from managing for such values as visual quality, wildlife and water quality, influence the actual minimum harvestable age.

In the 2004 Strathcona timber supply analysis, minimum harvestable ages were based on the age at which stands were projected to reach a minimum volume of 350 cubic metres per hectare and attain 95 per cent of their maximum average growth. Once these criteria were met, the stand was considered eligible for harvest. Forest stands on sites with low productivity were held beyond the age of maximum average growth until the minimum volume was reached, while in more productive areas, even if the minimum volume had been surpassed, stands were held until they reached 95 per cent of their maximum average growth.

In practice, some second-growth stands in the TSA are harvested at ages as young as 55 to 65 years of age, mostly through BC Timber Sales in the Sayward area designed to rationalize localized age-class imbalances and meet visual quality objectives.

Sensitivity analysis (Figure 15 in the analysis report) showed that harvesting (throughout the TSA) at the minimum volume without the requirement to reach 95 percent of maximum average growth could increase the short-term or mid-term wood supply, but if continued indefinitely, would significantly reduce the long-term supply. Specifically, the additional flexibility could be used to increase the medium-term harvest level to 870 000 cubic metres per year, or to maintain the current AAC for 10 years before declining to the base case mid-term level. However, in the latter case, if higher-volume stands continued to be harvested

in preference to lower-volume stands for an extended period, the mid-term level projected in the base case would be extended for an additional 60 years or so, and the long-term harvest level would be reduced by 70 000 cubic metres per year. In this scenario, trees across the TSA were able to be harvested, on average, about eight years younger than assumed in the base case.

In another sensitivity analysis examining the impact of *raising* the minimum merchantable volume by 100 cubic metres per hectare, about 6300 hectares of the area harvested in the base case became unmerchantable. However, the initial and mid-term harvest levels were only slightly reduced, indicating the dependence on harvesting timber at these volume is not overly critical to the projection.

In public input, a First Nations representative suggested that trees should be grown on 600- to 800-year rotations. In consultations this is a frequently expressed position relating to supplies of cedar for traditional and cultural uses as well as to the allowing of forest stands to grow old enough so that a variety of plants used for traditional medicines, food and other purposes can become re-established. I have noted earlier in *archaeological sites, culturally modified trees, and cultural heritage resource values,* that district staff indicate that the current demand for cedar for traditional and cultural uses can likely be met, but are uncertain whether, without additional provision, cedar trees of adequate size and quality will be available over the long-term to meet First Nations' needs. This is less an issue of the appropriateness of the minimum harvestable ages assumed for the whole TSA in the timber supply analysis, and more about the guidelines developed for managing cedar on the coast; as such it does bear on the availability of cedar in certain areas of the TSA and I have discussed this further in 'Reasons for Decision'.

Forest district staff consider that, particularly as operations are transferred from the Kyuquot Supply Block into the Sayward Supply Block, it is reasonable to assume that for some years there will continue to be harvesting performance in the Sayward at ages lower than those assumed in the base case, particularly in Douglas-fir forest types (though much less so, if at all, in other areas of the TSA). In this case, the sensitivity analysis described above indicates there is some flexibility to realize a temporary addition to the timber supply in either the mid term or the short term, without compromising the long-term productivity. Since this condition applies primarily to fir-leading stands in only the Sayward area at this time, it would be appropriate to assume just a suitable fraction of the full flexibility identified in the sensitivity analysis for the whole TSA. Fir stands comprise roughly 60 percent of the THLB in the Sayward supply block, which in turn comprises about one-third of the total THLB area.

From the temporary operational availability of younger second-growth stands in the Sayward area, and the identified flexibility in the short-term timber supply, I have concluded with the agreement of BCFS district and analytical staff that is appropriate to assign, for the effective period of this determination, a contribution of roughly 20 percent of the additional short-term timber supply identified in the sensitivity analyses as available over and above that projected for the short term in the base case forecast. This will provide 30 000 cubic metres per year for the first decade in addition to that projected in the base case, taking immediate advantage of just some of the identified additional flexibility otherwise available in the mid term without necessitating any revision to the projected long-term harvest level. This will also help to

bridge the period until new inventory and site index information can be compiled and analysed, as I have discussed in 'Reasons for Decision'.

Section 8 (8) (a) (ii) the expected time that it will take the forest to become re-established on the area following denudation:

Regeneration delay and impediments to prompt regeneration

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In the 2004 timber supply analysis, assumptions about regeneration methods (planting or natural regeneration) and about the length of regeneration delay were included as inputs to the 'TIPSY' model used to estimate volumes in regenerating stands. Generally, average regeneration delays of two years for fir, and three years for cedar, hemlock and spruce, were assumed, as detailed in Table A-26 of the timber supply analysis report.

Leading species for previously harvested stands were determined from the Silviculture Information Access (SIA) database as the leading species of the largest polygon within each opening. In some cases, this varied from the leading species shown in the forest cover inventory. Species assignment did not significantly alter the species profile for the TSA.

In public input, two licensees suggested that some of the assumed regeneration delays seemed too long, particularly for productive Douglas-fir sites, which they suggested should be six to twelve months. One licensee also noted that many sites are allowed to regenerate naturally while the table of assumptions indicates that all sites are planted.

District staff note that operationally all Douglas-fir sites are planted following harvest, that cedar sites are planted to cedar with the expectation of natural hemlock ingress, and that one licensee has a program to plant all harvested areas to hemlock mixed with a cedar or balsam component as appropriate. However, in all other areas (about 70 percent) of the TSA, hemlock-balsam sites are allowed to regenerate naturally except where cedar or balsam is planted as a component.

District staff agree that a one-year delay could be more appropriate for fir sites, which comprise about 22 percent of the timber harvesting land base, and this would result in a small, unquantified *under*estimation in the base case projection. However, they also acknowledge that in the analysis, all hemlock-leading stands were assumed to include either a cedar or balsam component that would be planted, whereas in fact much of the regeneration comprises natural ingress of hemlock. This would have a longer regeneration delay than the assumed planting, indicating a small, unquantified *over*estimation in the base case projection. The two small, unquantified discrepancies in regeneration delay act in mutually opposing ways, and in my judgement may be considered to have negligible net implication for the validity of the base case projection.

Not-satisfactorily-restocked and backlog areas

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Areas where the standard regeneration delay has not yet elapsed since

harvesting are considered 'current' NSR and fluctuate with the amount of logging currently taking place. Where a site was harvested prior to 1987 and a suitable stand has not yet been regenerated, a classification of 'backlog' NSR is applied.

In the 2004 timber supply analysis for the Strathcona TSA, all the land classified as current or backlog NSR, totalling 6800 hectares, was included in the current timber harvesting land base. Effectively there is no 'backlog' NSR in the TSA, and trees on 'current' NSR land were assigned an age based on the regeneration delay for the listed species (Table A-26 in the analysis report) and the year of harvest. I am satisfied that this provides an adequate accounting for these lands.

Section 8 (8) (a) (iii) silvicultural treatments to be applied to the area:

Silvicultural systems

Campbell River Forest District staff advise that the dominant silvicultural systems used in the Strathcona TSA are the clearcut and clearcut-with-reserves. Only very limited amounts of partial cutting, including 'single-stem' harvesting, have occurred in the TSA, primarily due to difficulty in managing wind-throw problems, particularly in west coast areas such as Nootka Island. Volumes retained in reserves within cutblocks are often integrated with assumptions for wildlife tree patches, which I have addressed these below, under Integrated Resource Management Objectives. In some areas, 'variable retention' has resulted in 'temporary deferral areas' that may remain for another 10 years or so before harvest, but these are not widespread and no attempt was made to model them separately.

In the past, significant areas in the Sayward Supply Block have been commercially thinned and the accounting for past commercial thinning in the analysis is discussed next, under *incremental silviculture*. However, little or no commercial thinning is planned for the future, mainly because the majority of stands that would have been considered eligible have either already been treated or have aged beyond the point where this treatment would be appropriate. No accounting was made for *future* commercial thinning.

In public input, First Nations noted that 'current performance' needs to reflect practices over the next five years, which is consistent with my determination process, and that long-term management is needed to allow the inventory to grow to a rotation of 600 to 800 years, which I have discussed in *minimum harvestable ages* and in *archaeological sites, culturally modified trees, and cultural heritage resource values*.

In conclusion, and with regard to the other sections of this rationale as referenced, I am satisfied that the assumptions in the base case projection are an adequate representation of the silvicultural systems currently practiced in the TSA.

Incremental silviculture

In general, incremental silviculture includes activities such as commercial thinning, juvenile spacing, pruning and fertilization, that are not part of the basic silviculture activities required to establish a free-growing forest stand.

Historical records originally showed 19 000 hectares in the TSA had been fertilized, of which 7000 hectares were treated once, 10 000 hectares were treated twice, and 2000 hectares were treated three times (for treatments totalling 33 000 hectares). Because some of the associated volume gains had already been captured in the site index estimates generated in the last re-inventory, it was proposed to reduce the assumed response by 44 percent. In preparing for the analysis, the actual total area of forest over 30 years of age recorded in the forest cover inventory with a history of fertilization was found to be just 7300 hectares (with some of the earlier fertilized areas in the Sayward having already been logged and some subsequently constrained from harvesting). In the analysis, the 44-percent reduction was not applied to these stands, and an associated net volume gain of 291 000 cubic metres was embedded in the base case projection. No additional gains were assumed to accrue from further fertilization in the future, as there is currently no plan or funding in place for such treatments.

Respecting commercial thinning, in the analysis 180 cubic metres per hectare were subtracted from the yield tables for the roughly 3200 hectares of affected (mainly managed fir) stands identified spatially by district staff. In my judgement this represents a reasonable adjustment to the volumes that may be expected to be available when these stands are ready for harvest. As there are no plans for further commercial thinning in the TSA, no further adjustments were made in the analysis.

In public input, one licensee suggested the model did not include any fertilization gains. However, this is not consistent with the record: I have reviewed in detail with BCFS staff the assumptions and methodology applied in the analysis respecting fertilization, as briefly summarized above. I am satisfied that although some unavoidable uncertainty remains as to the precise reconciliation between the originally identified 19 000 hectares and the current finding of 7300 hectares, every attempt was made to capture the potential gains associated with fertilization as accurately as possible, and that for the current AAC determination these gains are adequately reflected in the base case projection. For future analyses the associated gains will in any case be incorporated objectively through the re-inventory process.

Section 8 (8) (a) (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area:

Utilization standards

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. In the timber supply analysis, the utilization standards assumed were: for old growth, i.e. all natural stands aged at least 140 years, a 17.5-centimetre minimum diameter at breast height (dbh) with a 30-centimetre maximum stump height and a 10-centimetre minimum top diameter inside bark; and for second growth, i.e. all stands less than 140 years old, a 12.5-centimetre minimum dbh with a 30-centimetre maximum stump height and a 10-centimetre minimum top diameter inside bark.

The VDYP model used in the analysis for estimating timber volumes for all existing natural stands only provides information for a dbh of 17.5 centimetres on the coast. However, for old-growth fir in advanced managed stands, TIPSY was used, which more appropriately reflects the 12.5-centimetre minimum dbh.

The regional utilization standard for stands older than 140 years specifies a minimum top dib of 15 centimetres, compared to the 10 centimetres assumed in the model; however, forest inventory specialists of the former MSRM have indicated that the differences in yield will be negligible. For the current determination I am therefore satisfied that the utilization assumptions applied in the analysis are a reasonable approximation to current practice.

Decay, waste and breakage

The timber volumes projected for existing mature stands in the VDYP model are based on ground-sample data from which gross tree volumes are calculated and then reduced to reflect utilization respecting stump height and top removal, then further reduced to account for decay, waste and breakage. Standard provincial factors for decay, waste and breakage were applied in the analysis. District staff acknowledge there may be local anomalies for cedar, but the extent of any such variations from the standard is not known. In the absence of conflicting information and of any public input to the contrary, I accept that the standard assumptions incorporated in the analysis represent the best available information, and that the base case projection therefore accounts as well as possible for losses to decay, waste and breakage.

Section 8 (8) (a) (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production:

Integrated Resource management objectives

The Ministry of Forests and Range is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- cutblock adjacency, forest cover and green-up

To manage for resources including water quality, wildlife habitats, soil stability and aesthetics, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks and maximum disturbances (areas covered by stands of less than a specified height), and prescribe minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

For the Strathcona TSA, harvesting practices in areas outside known scenic areas must be consistent with requirements for areas defined in the Vancouver Island Land Use Plan (VILUP) as 'enhanced resource management zones' (ERMZs) and general integrated resource management (IRM) zones. The ERMZs comprise 12 percent of the THLB in this TSA.

In the 2004 base case analysis, for the IRM zone, a maximum of 25 percent of the area of the THLB outside any visually sensitive area in each landscape unit was allowed to be below a green-up height of three metres. For ERM zones, a maximum of 25 percent of the area of the THLB in the enhanced portion of each landscape unit, outside any visually sensitive area, was allowed to be below a green-up height of 1.3 metres.

In sensitivity analysis, the implications of reducing the maximum allowable disturbance from 25 percent to 20 percent were examined. The timber supply was only marginally affected around the fifth decade of the projection, the period of least available merchantable volume.

In another sensitivity analysis, the impact of using a spatial modelling approach, that effectively represented an overly-constrained scenario, was examined. In this scenario, cutblocks were allowed to range in size from 2 to 40 hectares while retaining a 200-metre buffer of forest cover adjacent to each block. The entire area inside each cutblock was required to reach 1.3 metres in height in enhanced resource management zones, and 3 metres in height everywhere else, before harvesting could occur in the 200-metre buffer. This procedure was operationally unrealistic and overly constraining in that it permitted, for example, the locating of a two-hectare block where a 15-hectare block could have been located. Nonetheless, the only impact to the projected timber supply began 40 years from now, showing that under even these unrealistically constrained conditions the short-term harvest levels projected in the base case could still be achieved for several decades. I have briefly reviewed some implications of this forecast under 'Alternative Harvest Flows' and in 'Reasons for Decision'.

In assessing the adequacy of the modelling rules assigned to represent cutblock adjacency in the base case and in the sensitivity analyses, I am mindful that they represent only a rough approximation to actual operational practice, which is often dependent upon costs and other changeable factors. However, I am advised by the analyst that the relatively low sensitivity of the timber supply to significant changes in adjacency assumptions, as demonstrated by the sensitivity analyses, could be further confirmed by other sensitivity analyses also showing little or no impact. District staff concur that the assumptions applied in the analysis provide a reasonable approximation to experienced operational constraints to timber supply from cutblock adjacency and green-up. Since it has been demonstrated that even unrealistically restrictive spatial constraints are unlikely to reduce the projected timber supply, and in the absence of any conflicting information, I conclude that the base case projection incorporates adequate flexibility to accommodate any anticipated operational deviations from the applied assumptions.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites, parks and major communities, is an important IRM objective that requires visible evidence of harvesting to be kept within acceptable limits in specified areas. Currently, the Forest Practices Code and the new FRPA provide for scenic areas to be identified and for visual quality objectives (VQOs) to be established to limit the amount of visible disturbance permitted in visually sensitive areas. Visual landscape inventories are carried out to identify, classify and record those areas of the province that are visually sensitive, and then appropriate visual quality classes (VQCs) are recommended—for example 'Preservation,' 'Retention,' 'Partial retention,' 'Modification', or 'Maximum Modification'—to identify levels of

alteration appropriate to particular areas. Guidelines to meet the VQOs include setting a maximum percentage of a specified area or 'viewshed' that is allowed to be harvested at any one time, and setting a 'visually effective green-up' or 'VEG' height at which a stand of reforested timber is perceived by the public to be satisfactorily greened-up.

In the Campbell River Forest District, visual landscape management is defined by the Chief Forester's directive '*Managing Visual Resources to Mitigate Impacts on Timber Supply (1998)*'. For the Strathcona TSA, visual landscape inventories were completed between 1988 and 1999, and scenic areas with recommended VQCs were made known to TSA licensees in October 2001; this inventory was used in the 2004 timber supply analysis. For the Sayward Forest, the inventory and analysis were updated and VQOs were established as part of the Sayward Landscape Unit Plan, in 2003. For all other areas in the TSA, the VQCs have now become VQOs, under recent regulation amendment.

The CCLRMP has proposed a regime for managing visual resource values but the plan is not yet signed off. Accordingly, this regime was not incorporated in the assumptions for the 2004 timber supply analysis and, in consistency with my guiding principles, I do not consider its potential implications in this determination.

The Forest Practices Board is currently investigating visual landscape management in the Campbell River Forest District. The board's preliminary results have identified a 'gap' in the scenic areas map with respect to management of the highway corridor along Highway 19. Although this may be significant operationally, district staff do not expect this 'gap' to compromise the validity of the base case timber supply projection.

District staff are currently reviewing visual landscape management and expect to have completed the public review and establishment of new VQOs for the TSA by mid-2005.

For the base case analysis, district staff assigned the maximum allowable disturbance in plan view based on effective historical visual design, with a green-up height of 5 metres. Sensitivity analysis was then done to examine the effects of localizing stand heights and maximum disturbance rates, with green-up heights ranging from 4.3 to 5.9 metres. Notably, the localization process, which incorporated slope analysis, indicated that visual areas in the Sayward landscape unit are generally on shallower slopes than the rest of the TSA, such that allowable disturbances are slightly higher and the VEG heights by recommended VQC are slightly lower than for the rest of the TSA. The results of the sensitivity analysis showed a 20 000-cubic metre increase in the mid-term harvest level.

In public input, licensees sought a comparison between the VQOs used in the 2004 and 1999 analyses, and wondered how the VEG height was defined. I am advised that the VEG height was defined in the model as 'top height', and that while the two VQO regimes are not directly comparable, the current strategy is consistent with the implementation of the VQO mitigation strategy.

In view of the results of the sensitivity analysis incorporating localized stand heights and maximum disturbance rates, I am satisfied that all reasonably foreseeable constraints on timber supply from managing visual resources in the TSA are adequately represented in the short-term harvest level in the base case analysis, but in making my determination I have

considered and taken into account a 20 000-cubic metre underestimation in the mid-term harvest level projected in the base case, as discussed in 'Reasons for Decision'.

- recreation

For the Strathcona TSA, Recreation Feature Inventories, dating from between 1988 and 1999, identify features including campgrounds, trails and interpretative forest sites by specific feature and management class codes that are more current than the earlier 'environmentally sensitive area' designations. Areas with very high recreation values were completely excluded in deriving the timber harvesting land base, while areas or features requiring special management for recreation were 50-percent excluded. The total area identified for exclusion amounted to almost 27 000 hectares, and net of other deductions, including 848 hectares for karst features, a total of 4505 hectares were excluded specifically for recreation.

In 2003, the inventory and analysis were updated and Recreation Objectives were written for the Sayward Forest as part of the Sayward Landscape Unit Plan. The CCLRMP has addressed recreation resource values but, as noted earlier, has not yet received signed approval and is therefore not accounted for in this determination.

The Nootka Sound, Kyuquot Sound and Johnstone Bute Coastal Resource Plans all addressed recreation resource values, and I am advised that recreation resource management in the Campbell River Forest District is already consistent with guidance provided by these plans.

District staff are currently reviewing the recreation inventories for the district and expect to have completed public review and identification of resource features for the TSA by mid 2005. The demand for opportunities in the TSA for public and commercial recreation is increasing, but so far most have been accommodated.

I have reviewed the land-base reductions applied in the analysis in recognition of the identified recreation features. Since the inventories on which they are based are the best currently available information, since recreation management in the TSA is already consistent with the Nootka, Kyuquot, and Johnston-Bute plans, and since some general level of satisfaction may be inferred from the lack of public input to this determination in respect of recreation, I conclude that the impacts on timber supply that may currently be expected for recreation and associated features are adequately incorporated in the base case timber supply projection.

- karst formations

Karst is a distinctive terrain or topography that develops from the dissolving action of water on carbonate bedrock, usually limestone, dolomite or marble. Karst is formed by geological processes that occur over thousands of years and result in features including fluted rock surfaces, vertical shafts, sinkholes, sinking streams, springs, complex sub-surface drainage systems, and caves. The 'openness' of karst surfaces allows for the exchange of air, water and nutrients. In areas dominated by karst environments, maintaining this openness is of primary management concern; some of the most productive forest sites occur in karst areas where timber harvesting must be carried out with extra care or, in some areas, avoided altogether.

District staff expect to complete a review and identification of all karst values as resource features by mid-2005, under the Government Actions Regulation. Significant karst areas are already identified on the recreation features inventory for the TSA, and associated operations

are conducted in accordance with the *Karst Management Handbook for B.C.* and the *Cave/Karst Guidelines* for the Vancouver Forest Region. District staff note that forest practices suitable for karst topography are still evolving, since karst management in B.C.'s coastal forests is relatively new, since managing karst means also attempting to manage underground systems that cannot be seen, and since research applicable to the local situation is limited.

Given the consequently limited information base, the impacts on timber supply from managing karst are difficult to predict with accuracy. However, much of the sensitive karst topography in the TSA is known to lie in areas that are inoperable or that are already excluded from the THLB for other objectives. I have discussed in some detail with district staff the extent of the areas characterized as having karst features, and the extent of the areas excluded for karst that were not already under other requirements for special management.

A total area of 20 000 hectares in the Strathcona TSA are identified in the recreation features inventory as having high or very high potential for karst formation. In the timber supply analysis, areas totalling about 10 000 hectares with karst potential were identified within the THLB, and were eight-percent excluded in deriving the timber harvesting land base, resulting in the exclusion of 848 hectares specifically in respect of karst potential.

In public input, it was suggested that (a) given the uncertain environmental resilience of karst areas, sites with both 'high' and 'very high' vulnerability should be excluded from harvest; (b) the definition of karst features warrants nearly 100 percent, rather than 8 percent, exclusion of areas with potential karst values; (c) karst should be considered separately from recreation since some karst areas without recreational values are also vulnerable.

In response, (a) in the Campbell River Forest District, the vulnerability of karst is assessed as a combination of sensitivity and significance, with both 'high' and 'very high' vulnerability generally being excluded from activities related to harvesting and road-building. (b) The eight-percent exclusion figure was derived from the ratio of actual area restricted from operations to the extent of the area mapped with a karst potential. In fact, all identified significant karst features were excluded 100 percent in the recreation feature deductions. (c) Because not all sensitive karst is valuable for recreation and because karst is a resource value in its own right, I have considered karst as a separate factor in this determination.

In reviewing the adequacy of the accounting in the timber supply analysis for the impacts of managing for areas with karst potential, I note the following. About half of the area with karst potential was completely removed from eligibility for harvesting in deriving the THLB. The remainder were eight-percent removed from contributing to the timber supply. From numerical comparisons and deductions in consultation with district staff, respecting the net extent of the operational constraint, it appears—though somewhat uncertainly—that the total constraint applied in the analysis directly for karst, 848 hectares, after recognition of exclusions for other values, may be marginally smaller than the actual area constrained specifically for karst operationally. However, the discrepancy is relatively small, and in my judgement it is reasonable to assume that the short-term timber supply supporting both the base case projection and the AAC that I have determined will provide sufficient flexibility over the next five years to accommodate uncertainties in the evolving management of karst

values, while staff refine the extent to which any possible additional requirements may need to be accounted for in the next analysis and AAC determination.

- community and domestic watersheds

The Strathcona TSA includes two designated Community Watersheds, Barton Creek covering 18 hectares and serving the community of Queens Cove, and John Hart Lake, covering 2520 hectares and serving Campbell River. In the analysis, no more than five percent of the productive forest in each of these watersheds was allowed to be disturbed in a five-year period. In the John Hart Lake area, harvesting has already been occurring, and more is proposed, with the active participation of the municipality of Campbell River. In the previous AAC determination, a third Community Watershed was modelled, Andrews Creek, serving the community of Kyuquot; this has since been de-listed, as Kyuquot now obtains its water supply from a drilled well. I am satisfied that the base case timber supply projection accounts adequately for the management regime in the two designated Community Watersheds.

- habitat for ungulates (deer, elk and goats)

Habitat for deer, elk and goats was addressed separately for the area covered by the Sayward Landscape Unit Plan, which was completed in 2003, and for the rest of the TSA. The Sayward plan identified old growth management areas (OGMAs), 85 percent of which are intended to be established as ungulate winter ranges as part of a TSA-wide exercise. This plan also established areas for elk visual cover, and an objective for deer spring forage. In the analysis, the OGMA winter ranges were 100-percent excluded from the timber harvesting land base. Areas established for elk visual cover were subjected to cover requirements specifying the maximum level of disturbance permissible consistent with maintaining particular forest conditions; in this case a maximum of 25 percent of the forested area in the sensitive wildlife area was allowed to be below a green-up height of three metres and a minimum of 50 percent of this forested area was required to be five metres or more in height. No specific modelling was applied to represent the spring forage objective, as this was expected to affect harvest scheduling only—likely to a degree only slightly greater than management for green-up and cutblock adjacency—with no impact on timber supply. In deriving the timber harvesting land base, a total of 3903 hectares were excluded for winter range for deer and elk within the Sayward Landscape Unit.

For the remainder of the TSA, habitat for ungulates was modelled based upon the existing wildlife mapping (EW1/EW2) used for the 1999 analysis, after resolution of a 1194-hectare discrepancy noted in the rationale for the 1999 AAC determination. Land base exclusions of 50 or 100 percent, or cover requirements, were applied as in Table A-8 of the timber supply analysis report, depending on the applicable management regime. From the total of 10 558 hectares identified as sensitive for wildlife values in the remainder of the TSA, after deductions for other objectives, a total of 4221 hectares were excluded from the timber harvesting land base. Deducting from this 197 hectares for the wildlife habitat area established for goshawks at Patterson Lake leaves an effective exclusion for ungulate habitat, outside the Sayward plan area, of 4024 hectares, resulting in a total exclusion for the TSA of 7927 hectares.

Staff of the Ministry of Environment (MOE) are currently engaged in a process, expected to be completed in 2005, to formally establish ungulate winter ranges for the entire Strathcona TSA, including the area covered by the Sayward Landscape Unit Plan. Any overlaps with areas to be established as OGMAs (which are intended to be found first in non-contributing areas) could decrease the overall associated timber supply impact, which for now must remain uncertain.

Staff of the MOE note that the current policy 'budget' of 7448 hectares for winter range in the Strathcona is carried over from both previous timber supply reviews, and that when current inventory data are applied to the same polygons, but using the revised sequence of land base deductions used in the 2004 analysis, the affected area of 7927 hectares noted above is derived. This figure is considered to more reliably represent the true timber supply implications of an updated budget for ungulate habitat requirements, based on the same original polygons.

My conclusion from the information before me is that since the same, unchanged polygons have been used in defining the land area required for winter range management, the actual habitat requirements have remained consistent throughout the successive timber supply reviews. However, in the present situation, due to changes in the order of land base deductions, or in the extents of areas formerly required to meet multiple objectives including ungulate range, analysis based on the same polygons has left a greater amount of excluded area than before attributable solely to ungulate management. Therefore, although the impact of ungulate habitat management may appear larger than in previous reviews, I consider the current assessment, as incorporated in the 2004 analysis, to be the most reliable indicator of the requirements for ungulate habitat management, and I am satisfied that the assumptions in the base case projection require no adjustment in this respect. The forthcoming designation of these areas should bring resolution to any remaining uncertainty in the overall extent of these requirements.

- identified wildlife

Identified Wildlife are those wildlife species and plant communities that have been approved by the Ministry of Environment (formerly the Ministry of Water, Land and Air Protection) as requiring special management. On February 19, 1999, the province of B.C. announced an Identified Wildlife Management Strategy (IWMS) for dealing with endangered, threatened, vulnerable, and regionally significant species that have not been accounted for by existing management strategies for biodiversity, riparian management or ungulate winter range, or through the application of other forest cover requirements.

Identified wildlife species requiring special management in the Campbell River Forest District include the Coastal Tailed Frog, the Red Legged Frog, the Northern Goshawk, the Great Blue Heron, the Marbled Murrelet, the Short Eared Owl, two subspecies of the Wolverine, the Vancouver Island Marmot, Keen's Long-Eared Myotis, and the Grizzly Bear. At the time of completion of the 2004 timber supply analysis, only one wildlife habitat area (WHA) was formally established within the TSA, for nesting Northern Goshawks at Patterson Lake and including a post-fledgling area that resulted in a net land base exclusion of 197 hectares from the timber harvesting land base. This WHA includes a larger 'general foraging area' of about

2400 hectares over which a forest cover requirement has been established such that no more than 15 percent of the forested area within the WHA may be disturbed every 20 years.

As of December 2004, an additional 5092 hectares of WHAs had been established in the TSA, with a net estimated reduction to the THLB of 892 hectares, subject to some uncertainty including the extent to which the establishment of OGMAs and WHAs will overlap. This 892 hectares could not be accounted for in the base case analysis which was completed by October 2004.

In public input, one individual confirmed that the wolverine is extirpated from Vancouver Island, which has been true for some time and which is unfortunate to note, but which has no implications for the validity of timber supply projections at this time. (Environment Canada notes at http://www.speciesatrisk.gc.ca/search/speciesDetails_e.cfm?SpeciesID=172 that 'a distinct subspecies may no longer be extant on Vancouver Island, where Wolverines have not been seen since 1992; their decline may be related to that of the endangered Vancouver Island Marmot, a potential summer food'.) A First Nation representative suggested that logging on the east side of Vancouver Island should be very selective to protect rare and endangered species. As noted above, the IWMS, represented in the analysis by a combination of forest cover requirements and land base exclusions, is intended to provide for any endangered, threatened, vulnerable, and regionally significant species not already accounted for under general biodiversity provisions.

The requirement to account for a deduction of 892 hectares of mature and old-growth forest on the THLB in respect of the WHAs designated by December 2004 indicates an overestimation in the base case forecast. In fact, the IWMS provides by policy for an overall impact of one percent on the timber supply across each forest district. If it is assumed, reasonably, that this impact is to be evenly distributed on TSAs and TFLs then the maximum overestimation in the base case for the TSA would be one percent throughout the forecast period, consistent with the approach taken in AAC determinations by the previous chief forester. In the present case, if this is roughly equivalent to a total area impact of one percent on the timber harvesting land base, or 1650 hectares, and so far 197 plus 892 = 1089 hectares have been designated, the one-percent figure leaves room for a maximum impact of a further 561 hectares. However, the actual impact will depend upon the IWMS orders made by the Ministry of Environment (MOE) for the district as a whole under Section 7a of the FRPAct. In the interests of good stewardship and of reducing uncertainties in timber supply analysis, I encourage MOE staff to expedite the process of WHA designation in this TSA, as I have noted in the 'Implementation' section. Meanwhile, in the absence of specific quantification, since WHAs are still being designated I have assumed an overestimation of something less than one percent (since the 197 hectares were already accounted for) throughout the base case projection; I have accounted for this in my determination as discussed in my 'Reasons for Decision'.

- stand-level biodiversity

Biological diversity, or biodiversity, is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. Under the Forest Practices Code and the new FRPA legislation biodiversity in a given management unit is assessed and managed at both the stand and landscape levels. Stand-level biodiversity is managed in part by

retaining reserves of mature timber or wildlife tree patches within cutblocks to provide structural diversity and wildlife habitat. The amounts of forest cover required to be retained in wildlife tree patches are derived from the Province's *Biodiversity Guidebook* and the *Landscape Unit Planning Guide*.

To estimate the operational amount of Wildlife Tree Retention, BCFS staff reviewed a representative sample of current silviculture prescriptions in the TSA. The results were compared with the assumption, in the previous timber supply review, that 8 percent of the forested area of each cutblock would be retained as wildlife trees, with 75 percent being contributed from inoperable areas and 25 percent from operable areas, to produce a net impact of 2 percent on the area of the timber harvesting land base. The review showed that under current practice, an average of 14 percent is actually retained, of which 40 percent comes from areas already constrained for other objectives (e.g. riparian areas), and 60 percent from unconstrained areas, for a net area impact to the timber harvesting land base of 8 percent. District staff consider this to be consistent with their practical experience.

For the 2004 timber supply analysis, the wildlife tree patch requirements assessed by Coast Forest Region staff according to the *Biodiversity Guidebook* were applied in a spatial exercise to THLB land that was not within 200 metres of other forest stand structure outside the THLB. It was assumed that 'otherwise constrained' forest stands (e.g. in riparian areas) can meet the requirements for Wildlife Tree Retention without additional contribution. A 200-metre buffer was delineated spatially into the THLB around those forested stands, in which it was assumed no wildlife tree patches were required due to the proximity of the existing stand structure. Using both of these assumptions it was found that a total of 133 315 hectares of the THLB lies within these 200-metre buffers and requires no additional Wildlife Tree Retention, while a remaining 27 685 hectares of 'unconstrained THLB', requires full Wildlife Tree Retention. Using the regionally derived percentages, a total area of 2330 hectares of forest will therefore be needed to provide for Wildlife Tree Patches. A land base reduction of this size was applied in deriving the THLB for the 2004 analysis. While the timber supply impact of wildlife tree patches would be larger without the contribution from riparian areas, the percentage impact derived by this method is comparable to the operationally reviewed figure of 8 percent.

In public input, a question was raised regarding the comparability, in this and the previous timber supply review, of the assumptions for wildlife tree patch requirements (and for riparian management, considered below). The assumptions for wildlife trees in this review are discussed just above, while in the previous timber supply review, the requirements were based on a policy goal of a 2-percent impact. A recommendation was also made by a First Nations representative to employ a precautionary approach in managing watersheds, fish habitat, and landslide-prone terrain; this is in fact consistent with the nature of the current practices analysed and considered in this determination.

In conclusion, in determining the requirements for stand-level biodiversity it is clearly appropriate to include contributions from otherwise constrained areas, including riparian areas. As noted in the next section, 45 percent of the total unharvested area within reviewed riparian management zones was also designated as wildlife tree patches. A significant change in the area retained in riparian zones would significantly affect the area required to be retained in wildlife tree patches. From the description of the methodology employed to determine wildlife tree retention requirements and from the exclusion of the corresponding land base from the

THLB, I am satisfied that the assumptions in the base case projection properly reflect current practice and that the forecast provides a reliable basis for my considerations in this respect.

- riparian habitat

Riparian habitats occur along streams and around lakes and wetlands. Both the Forest Practices Code and the *Forest and Range Practices Act* require the establishment of riparian *reserve* zones that *exclude* timber harvesting, and riparian *management* zones that *restrict* timber harvesting, in order to protect riparian and aquatic habitats.

For the 2004 timber supply analysis for the Strathcona TSA, to estimate the area needed in riparian reserves and riparian management zones, a GIS consultant used data from the Terrain Resources Information Mapping—TRIM2—watercourse line work, provided by BCFS regional staff, to define stream, lake and wetland classes, based on predictive modelling. Lake and wetland categories were based on biogeoclimatic subzone variants as outlined in the *Riparian Management Guidebook*. All 'double-line' streams were considered to be 'S1' streams. Streams with slopes of less or greater than 20 percent were classified as fish-bearing or non-fish bearing, respectively.

BCFS staff note that the TRIM2 inventory shows more streams than TRIM1 (used in the 1999 analysis), but lacks the coding to differentiate between S2, S3 and S4 streams and between S5 and S6 streams, and that some 'streams' shown in TRIM2 may be no more than folds in the terrain. To reduce uncertainty, stream class data obtained operationally by licensees and BCFS staff was used wherever it was available.

The buffer widths assigned to each riparian feature class accounted both for the 100-percent exclusions in the riparian *reserve* zones, and for the retention in riparian *management* zones, and represent the portion of the total riparian management area assumed to be unavailable for harvest. Estimates of riparian *management* zone retention were based on a sample of 29 cutblocks logged since 1997 with a total harvested area of about 900 hectares, roughly 60 percent of the area harvested per year in the TSA. This review showed that 45 percent of the total unharvested area within riparian management zones was also designated as wildlife tree patches. In the timber supply analysis report, Table A-10 shows the calculated zone widths, percentage retention, and modelled buffer widths for lakes, wetlands and streams, and Table A-11 shows the riparian buffer area removed from contributing to the THLB. The total area of productive forest under riparian management was identified as 42 265.5 hectares, of which 26 350 hectares were excluded specifically for riparian objectives, the difference being already excluded for other objectives.

The mapped area for riparian management amounts to roughly 12.7 percent of the operable forest land base. District staff suggest that the riparian area excluded from the THLB in the base case analysis may overestimate the area retained in practice, due to uncertainty primarily in the prediction of stream classes, and secondarily in the estimates of retention in riparian management zones. For comparison, in the 1999 analysis for the Strathcona TSA, a map-based assessment of riparian requirements, derived from studies of 13 mapsheets covering a total forested land base of 137 356 hectares and extrapolated to the whole TSA, indicated that riparian reserve guidelines and best management practices for riparian management zones, as

recommended within the *Riparian Management Area Guidebook*, would reduce the operable forest land base by only 6.1 percent.

The uncertainty in stream class prediction arises in good part from the noted differences between the TRIM1 stream inventory, with its less dense stream network, used in the 1999 analysis, and the TRIM2 stream inventory used in this analysis, with the much denser stream network, but less reliable coding. District staff note that while the TRIM1 inventory missed many smaller streams, a significant number of the additional stream features captured in the TRIM2 inventory may not require management.

To assess the magnitude of any associated potential error, a sensitivity analysis was carried out using riparian buffers based on the TRIM1 line work. This resulted in an area exclusion comparable to that in the 1999 analysis for riparian alone (4.8 percent of the operable forest), but held significant implications for wildlife tree retention. In this analysis, the riparian land base reduction dropped from 26 350 hectares to 9838 hectares, but because portions of stands that were assumed in the base case to be retained as part of a riparian reserve were now available for harvest, in order to meet stand-level biodiversity objectives the area required for wildlife tree retention had to almost double to about 4031 hectares. Nonetheless, under this scenario, the timber harvesting land base would increase by roughly 9 percent or 15 000 hectares, allowing the initial harvest level in the base case to increase by at least 30 000 cubic metres per year, with a mid-term harvest level increase of 100 000 cubic metres.

In public input, licensees questioned the assumptions for riparian management, with one disputing the 'double-line-S1' correlation, noting an apparent absence of field verification, and comparing lower exclusions for riparian management in nearby TFLs. Another licensee group suggested postponement of the determination pending a review of these assumptions; I have addressed the matter of postponement earlier.

District staff accept the shortcomings in both TRIM2 and TRIM1 as described; using TRIM2 probably leads to an overestimate in the buffers required for small streams and thereby to an underestimation in the available timber supply, while TRIM1 gives better representation of the various stream classes but misses some small streams and requires additional wildlife tree retention to compensate. District staff do advise, however, that on a 1:20 000 air photo, the mere appearance of two lines must represent a width of least 20 metres, indicating an S1 stream. They also note that in at least some cases, in the TFLs, exclusions refer to reserve zones only, as the management zones may be fully logged as permitted by law. I have reviewed these concerns and responses in my considerations and have concluded as follows.

I agree with district staff that the riparian area excluded from the THLB in the base case (12.7 percent of the operable area) likely overestimates the area retained in practice, due to uncertainty (a) in the prediction of stream classes—particularly the non-discrimination of indeterminate small streams—and (b) in the estimates of retention in riparian management zones. The 20-percent gradient criterion may also contribute to this overestimation, due to levelling out after steeper gradients, and my own experience from an aerial tour of the TSA did not reveal streams every 200 metres or so, as appears to be indicated in the TRIM2 data.

However, staff also indicate, and I agree, that (due to missing streams) the use of TRIM1 data in the sensitivity analysis probably contributes to an underestimation in the required land base exclusion (4.8 percent of the operable area). It is reasonable to expect that the most accurate

land base deduction lies between TRIM1 and TRIM2, and I recall that the studies from the 13 mapsheets for the 1999 analysis indicated a reduction to the operable forest of 6.1 percent, which is closer to the TRIM1 result. The relative agreement between the TRIM1 figure of 4.8 percent and the district mapsheet estimate of 6.1 percent , when contrasted with the significantly greater TRIM2 figure of 12.7 percent, implies to me that the true figure for the deduction is likely to be in the lower end of the indicated range. In the absence of more conclusive guidance, for this determination I have decided to accept the figure of 6.1 percent from the district's mapping exercise as a reasonable approximation to the actually required exclusion.

From the sensitivity analysis it is clear that overestimation in riparian requirements in the base case affords additional flexibility in the timber supply, which the timber supply analyst confirms may be available in the short and/or the mid term, depending on the chosen harvest flow. When the full land-base overestimation associated with the TRIM1 figure of 4.8 percent was assumed in sensitivity analysis, this produced a 9-percent increase in the THLB. The use of the district mapping figure of 6.1 percent instead, approximates proportionally to an underestimation of 7.5 percent in the THLB derived for the base case. I have taken this underestimation into account in my determination as discussed in 'Reasons for Decision'.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest-stand attributes and structures across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that these components together with other provisions in the Forest Practices Code—such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms.

- seral stage cover requirements

A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of forest cover at various ages or 'seral stages', including old-growth forest, for species that depend on or are strongly associated with these forests. Although some general forest management practices can broadly accommodate the forest cover needs of most ecosystems, more often a variety of practices is needed to represent the different natural disturbance patterns under which ecosystems have evolved. Natural disturbance types (NDTs) vary from frequent wildfires in the dry interior regions to rare stand-initiating events (from wind, fire, and landslides) in the wetter coastal regions. In NDTs 1 and 2, old seral forest is defined as stands older than 250 years. The mature age for NDTs 1 and 2 is 80 years in the coastal western hemlock zone and 120 years in the mountain hemlock zone.

In the Strathcona TSA, the only landscape unit with designated old-growth management areas, OGMAs, is the Sayward. As I have noted earlier, in – *habitat for ungulates*, about 85 percent of these OGMAs will also be established as ungulate winter ranges under a process expected to be completed later this year. For this reason, in the analysis, most of the land base exclusion from the THLB for retained old growth in the Sayward area is

assigned to ungulates, with an additional 470-hectare reduction attributable to the remaining OGMAs that will not be established as ungulate winter range.

For all other landscape units, the biodiversity guidelines with the draft biodiversity emphasis options were modelled based on the old seral requirements in the *Biodiversity Guidebook*. For low biodiversity emphasis option areas, a recruitment strategy will be put into place if required, to ensure that the old-seral objectives are achieved by the end of the third rotation. Forest cover requirements have been determined for each ecosystem type (BEC variant) within each landscape unit. Under the Vancouver Island Land Use Plan, objectives for mature seral forest require between one-quarter and one-third of the forested area in special resource management zones (the only areas where these objectives are applied) to be mature or older.

Sensitivity analysis (Figure 24 in the timber supply analysis report) shows that the base case forecast is relatively insensitive to changes in the level of natural disturbance outside the THLB.

In public input, one First Nation stressed the importance of modelling biodiversity and expressed concern that progressive clearcuts have changed the forest herb and shrub layers such that, in combination with lower rotation ages, the forest never reaches the age at which these plants can grow. In response, while the OGMAs and wildlife habitat areas will likely provide appropriate conditions in certain areas, I would also suggest sharing related information in an ongoing dialogue with the BCFS district staff, to identify plants of concern and areas of current and potential location, such that these may be taken into account in operational management.

A licensee representative inquired whether the biodiversity modelling assumption for landscape units with the 'low' biodiversity emphasis option would result in targets being met after two rotations, i.e. 140 years, or three rotations, i.e. 210 years; as noted above and in the data package, the latter is the correct response. One member of the public offered the view that this report points the way to continued loss of biodiversity and species extirpation for the sake of sustained yield forestry, and that there is a need to increase OGMAs and wildlife habitat areas to preserve biodiversity in the area. These are policy matters for government which I cannot address in AAC determinations under Section 8 of the *Forest Act*, but I note that government is working steadily toward issuance of orders dealing with OGMAS and WHAs to meet biodiversity objectives.

From these considerations and from my discussions with district staff, I accept that the currently identified landscape-level biodiversity requirements in the Strathcona TSA are adequately represented and accounted for in the base case projection in relation to current practice. Staff should continue to monitor the interplay between the official designations of OGMAs and WHAs through anticipated planning processes, together with the IWMS, and the associated implications for seral stage requirements and timber supply.

Section 8 (8) (a) (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber:

Second-Growth Strategy

In the Strathcona TSA, most of the second-growth stands at or approaching harvestable age are located in the Sayward area. The Sayward Landscape Unit Plan was completed in 2003, establishing IRM objectives, including timber objectives, and the volume-based tenures have been redistributed to approximate a harvest target of 360 000 cubic metres per year in the area. Some harvesting in second-growth timber is also beginning in the Loughborough area. I am satisfied that good preparations have been made in the Sayward area to facilitate the near-term aspects of the necessary transition to the projected to future dependence on second-growth stands in the base case forecast. Plenty of time remains before preparations will be required to bring the stands of currently 20-to-30-year-old second growth in the Kyuquot into the harvest. I understand that a transition of harvesting operations from old-growth stands in the Kyuquot area to second-growth stands in the Sayward area is already underway. From these considerations I am reassured that adequate provision is being made at this time respecting the future dependence of the timber supply forecast on second-growth stands in the TSA.

Planning issues and Land Base Adjustments

- Central Coast Land and Resource Management Plan

The Central Coast Land and Resource Management Plan (CCLRMP) area includes about 20 percent of the THLB of the Strathcona TSA. Under this plan, new protected areas, a proposed ecosystem-based management regime, and a new 'experientially-based' visual landscape management regime could have significant implications for timber supply in the TSA. However, until the plan is approved by government and implemented, the full extent of these implications cannot be known, and in accordance with my guiding principles I will not speculate on the outcome of the plan. I note provisionally that only 20 percent of the THLB in the TSA will be affected, and that some lessening of restrictions may occur in the southern areas of the plan, where this TSA lies; however, any net timber supply implications of this in combination with ecosystem-based management are unclear. If the approval and implementation of the plan result in implications that are unmanageable under the AAC I am now determining, I will return to redetermine the AAC for the TSA before the statutorily required period.

In respect of the candidate protection areas and option areas, parts of the TSA have been specified by government as designated areas under Part 13 of the *Forest Act*. The Minister of Forests suspended harvesting in these areas on February 27, 2005, by written order under Section 170. The total area so designated within Strathcona TSA is 2840 hectares. The area covers 857 hectares (0.6 percent) of the timber harvesting land base, and 401 hectares (0.7 percent) of mature timber on the timber harvesting land base. I will consider this information along with the outcome of associated First Nations consultation in making a decision on whether and by how much to reduce the AAC in light of the Part 13 designations. I will issue a separate order under Section 173(2) of the *Forest Act* subsequent to making my AAC determination under section 8.

- treaty land selections

The Maa-nulth First Nations (Ka:yu:'k't'h'/Che:k:tles7et'h', or Kyuquot/Checlesaht, in the Campbell River Forest District) and Sliammon First Nation are currently as Stage 5 of the 6-stage treaty process. I am advised that government has recently made a formal offer of treaty lands to the Maa-nulth First Nations, which includes area within the Strathcona TSA. The treaty settlement lands have been specified as a designated area under Part 13 of the *Forest Act*. The Minister of Forests suspended harvesting in the area on April 15, 2005, by written order under Section 170 of the Act. Within the Strathcona TSA, the Maa-nulth Designated Area covers about 2850 hectares (1.8 percent) of the THLB, and about 1.3 percent of the mature timber on the THLB. I will review the timber supply implications of the harvest suspension as soon as possible along with the outcome of associated First Nations consultation, and if necessary make an adjustment to the AAC by separate order under Section 173(2). Further, in accordance with my guiding principles, if a treaty is signed during the five-year effective period of this determination, formalizing the removal of these lands from the TSA, I will if necessary revisit this AAC determination at an earlier date than required by statute.

- 2002 take-back from TFL 47

Due to a five-percent 'take-back' upon a change of ownership of TFL 47, a forested area supporting a harvest of 26 008 cubic metres per year has been transferred to the TSA from the TFL. However, in the absence of definitive inventory information the associated land base was not included in the 2004 timber supply analysis. Regional and district staff note the land essentially constitutes a 2-percent increase in the THLB of the TSA, and that the land supports sufficient mature volume to sustain an additional harvest of 26 000 cubic metres per year, taking requirements for adjacency and other objectives into account. I have reviewed the age-class distribution of the TFL land and I note that the largest component of the timber, comprising 69 percent of the area, is aged over 60 years (mostly 61 to 80 years) and is therefore immediately available to contribute to the harvest. Most of the rest is between 20 and 40 or 40 and 60 years of age. I am advised that VQOs were factored into the calculation of the available timber. With the concurrence of district staff and the timber supply analyst, I therefore consider it reasonable to conclude that an additional 26 000 cubic metres per year can be supported in the short term until the younger component becomes ready for harvest, such that the land will support the additional 26 000 cubic metres per year throughout the forecast period. I have accounted for this in my determination as discussed in 'Reasons for Decision'.

- land alienation

Land and Water British Columbia Inc.'s marketing program for Crown land in the area could affect the future timber supply. Associated impacts could be influenced by changes in buffer zones, visual quality objectives, and other 'interface' issues. The outcomes are unknown at the present time and will be accounted for in future determinations as appropriate.

- timber reallocation project

The eventual removal of lands from TFLs and their assignation to this TSA may result in an increase in area for this TSA. Again, it is premature to speculate on the associated impacts.

Distribution of Harvest

The TSA comprises three timber supply blocks: the Kyuquot to the west, the Sayward to the east of Strathcona Provincial Park, and the Loughborough on the mainland. The declining availability of harvestable old growth in the Kyuquot area has led to previous forecasts of shortfalls in the area, necessitating the allocation of more of the harvest in the TSA to the other supply blocks. In consequence, the 1999 AAC determination rationale instructed:

> An early and comprehensive approach to land use and operational planning in the Sayward and Loughborough supply blocks is urgently required to accommodate the additional harvesting that must begin to take place in these areas consistent with the planned decline in the level of operations in the Kyuquot area.

In response, local government agency staff completed the Sayward Landscape Unit Plan in early 2003, and reallocated forest licensees' operating areas, reducing the harvest allocation in the Kyuquot from about 800 000 cubic metres to a harvest target of just over 700 000 cubic metres, largely by a transfer of operating areas from the Kyuquot block to the Sayward block. District staff expect that, as the levels of available growing stock continue to decline in the Kyuquot area, more such transfers and reallocations will be required, to gradually reduce the harvest in the Kyuquot area, while gradually increasing the harvest from the Sayward area, to contribute to stability in local economies and to maintain environmental values.

The 2004 timber supply analysis examined the implications of two different rates of short-term decline in the harvest level in the Kyuquot area, using the base case management assumptions (Figure 7 in the October 2004 report). The analysis showed that in each case, under the differing transition times, the base case forecast can be achieved. However, one of the scenarios included steep reductions to low harvest levels in the Kyuquot, particularly in decades 3 through 5—implying sharp, compensatory increases in the harvest required from the other two supply blocks. District staff believe these problems could be at least partially offset by more harvest performance in the Kyuquot in areas with less stable terrain or with lower stand volume and value, or through riparian area management or flexibility in minimum harvestable ages. However, this would clearly require prior monitoring to assess the feasibility and likelihood of such performance.

From the sensitivity analysis, and from the transfer and reallocation of operating areas from the Kyuquot area to the Sayward area, with its now completed landscape unit plan, I am reassured that, provided the reallocation of operating areas continues, the redistribution of the harvest from the declining stocks of old growth in the west to the planned and managed stands in the east, will support the continuation of a timber harvest from the TSA as forecast in the base case. The rate of decline of the Kyuquot harvest and any related impacts on communities will be affected by the ability of licensees to perform operationally as indicated; I therefore encourage monitoring to assess potential harvest contributions from the identified stand types.

First Nations

Fourteen First Nations, ten of which are located in the Strathcona TSA, have asserted territorial interests in the TSA. Four treaties, representing eight First Nations, are currently being negotiated. The 14 First Nations are identified in the 2004 timber supply analysis report, which also notes a number of issues raised by or of interest to First Nations. Other issues have been communicated to this review process by letter. I have addressed some of these issues, as appropriate, in earlier sections of the rationale; others are discussed below.

- *consultation*

At the commencement of the public review period in mid-October, 2004, letters were sent to all 14 First Nations, with copies of the timber supply analysis report and the public discussion paper for the TSA. Follow-up letters were sent from the district office in December 2004, followed by a number of phone calls and e-mails to all First Nations asserting traditional territory in the TSA. In early March 2005, further letters were sent to all First Nations that had not responded. Letters of response were received from the Kwakiutl District Council and the Qualicum First Nation. Region and district staff have engaged in extensive correspondence with the Ehattesaht Tribe between December 2004 and June 2005, pertaining to this AAC determination and to other statutory decisions. I have also considered input received orally by district and regional staff, in the form of notes from a meeting with the Hamatla Treaty Society, and two meetings with the Ka:' yu:'k' t'h'/Che:k:tles7et'h' Nations.

The Ehattesaht Tribe submitted a proposal in December 2004 for a consultation process which takes into account the principles established in the recent Haida decision, stating that the consultation process must be defined prior to their commenting on the timber supply review. This request for mutual adoption of an expanded consultation process before input can be provided suggests that additional input may be forthcoming over the next few months. I understand that district and regional staff have engaged in both written correspondence and telephone communication with the Ehattesaht, offering to meet to clarify concerns and investigate possible next steps. From a recent letter from the Ehattesaht Chief, I am aware that the tribe considers the determination of an AAC to be an authorization of an infringement of title, and that the Ehattesaht wishes to ensure long-term sustainability of timber harvesting in the territory in which it has expressed interest, to ensure the AAC determination accords with a sustainable rate of cut in the area over which it claims title.

In response, I understand that district staff have made efforts to consult with the Ehattesaht First Nation regarding this decision to identify the scope and nature of the Ehattesaht's aboriginal interests and concerns and how these interests may be impacted by this decision. I am also aware that BCFS staff met with representatives of the Ehattesaht Tribe on May 17, June 21 and July 4, 2005 to further discuss the timber supply review, forest stewardship plans and terms of an accommodation agreement—an agreement that would address a number of issues and concerns respecting a protocol for consultation and address accommodation through the provision of economic benefits in the form of revenue sharing and tenure opportunities. I am also aware the Ehattesaht First Nation holds a replaceable forest licence in the Strathcona Timber Supply Area. Although I understand the desire of Ehattesaht to have a consultation agreement in place, until such an agreement is in place, I am compelled to follow the Ministry of Forests Aboriginal Rights and Title Policy and Consultation Guidelines. To

this end, I believe the process for consultation with First Nations has been adequate and I have duly considered all issues and interests raised by First Nations in the consultation process, and have addressed, those issues and interests that are within my jurisdiction to address. Respecting questions of sustainability in specific areas of TSAs, such as areas over which aboriginal title has been asserted, I note in consistency with my predecessor that a main purpose of the timber supply review is to establish AACs at levels that will help to avoid undesirable fluctuations in the future timber supply, and that will provide for sustainable harvest levels in the long term. The *Forest Act* provides for the determination of only one AAC for each TSA, and in fact, the establishment of sustainable, non-declining harvest levels for a series of smaller areas within the TSA, such as individual landscape units, typically would reduce the available harvest over time, both in the individual areas and in the overall area. In the absence of the inclusion of a specifically related policy in the Minister of Forests' expression of the social and economic objectives of the province, at this time I cannot account for a land-use restriction of that nature in an AAC determination.

- treaty status

The Maa-nulth First Nations (Ka:yu:'k't'h'/Che:k:tles7et'h', or Kyuquot/Checlesaht, in the Campbell River Forest District) and Sliammon First Nation are currently at Stage 5 of the 6-stage treaty process. I am advised that government has recently made a formal offer of treaty lands to the Maa-nulth First Nations, which includes area within the Strathcona TSA. The treaty settlement lands have been specified as a designated area under Part 13 of the *Forest Act*. The Minister of Forests suspended harvesting in the area on April 15, 2005, by written order under Section 170 of the Act. Within the Strathcona TSA, the Maa-nulth Designated Area covers about 2850 hectares (1.8 percent) of the THLB, and about 1.3 percent of the mature timber on the THLB. As mentioned previously under *treaty land selections*, I will review the timber supply implications of the harvest suspension along with the outcome of associated First Nations consultation as soon as possible, and if necessary make an adjustment to the AAC by separate order under Section 173(2). Further, in accordance with my guiding principles, if a treaty is signed during the five-year effective period of this determination, formalizing the removal of these lands from the TSA, I will if necessary revisit this AAC determination at an earlier date than required by statute.

- Forest and Range Agreements (FRAs)

Under the Forest Revitalization Strategy, offers to negotiate interim accommodation agreements called Forest and Range Agreements (FRAs) will be made to all First Nations in the Campbell River Forest District to enter into FRAs that include the provision of economic benefits in the form of forest tenure opportunities and revenue sharing as interim accommodation for potential infringements of aboriginal interests resulting from government decisions, including the setting of the AAC.

To date, offers to negotiate accommodation agreements have been made to the Sliammon, Homalco, Nuchatlaht, Mowachat Muchalaht, Kyuquot/ Checklesaht, Ehattesaht, Comox, Cape Mudge, Tlowitsis and Campbell River First Nations. So far, the Homalco, the Kyuquot/ Checklesaht, Comox and Cape Mudge have signed FRAs. Sliammon has signed an interim measures agreement including direct award tenure opportunities. Many of the tenure

opportunities will be situated in the Strathcona TSA and will utilize volume from the Forestry Revitalization Act reallocation process

- comments from First Nations

I have addressed some of the comments and observations received from First Nations' representatives in earlier sections and other comments have been addressed by district staff in direct communications. Further comments, with my responses, follow:

- *Concern that collaborative consultation and inventories are completed prior to discussions on harvesting are essential*—District staff have made significant efforts to consult with First Nations regarding the Strathcona Timber Supply Review process. In addition, prior to harvesting occurring on the ground, additional consultation requirements exist on operational plans. FRPA outlines the planning requirements for operational plans that licensees must meet. Inventories and assessments may be necessary in order for licensees to develop results or strategies that meet the objectives set by government for the range of resource values.
- *Concerns about deductions for cultural heritage resources*, (some of which I have discussed under *archaeological sites, culturally modified trees, and cultural heritage resource values)* and in particular *the need for 100-percent land base reductions*—The range of current management options for cultural heritage resources does include full deduction for areas where available information indicates such a need.
- *Cedar, both red and yellow, and yew are important species to First Nations and need to be inventoried*—BCFS staff are available to discuss the availability of these species operationally as well as the related inventory issues.
- *The timber supply review should reflect the need to propagate cedar*—The timber supply analysis and AAC determination incorporate current management and practices as inputs, rather than determining them. Cedar is planted on ecologically appropriate sites with the general goal of replacing species roughly in the same proportion as that existing on the site prior to harvesting.
- *Are there stands of high-quality old-growth red and yellow cedar in the TSA?*—Fourteen percent of the THLB is red and yellow cedar of all age classes. The document *Guidelines for Managing Cedar for Cultural Purposes*, January 2005, is intended to provide guidance on suitable strategies for meeting First Nations' needs for cedar that should be implemented at the operational planning level. Some additional cedar is found in areas not included in the THLB.
- *First Nations have traditional use study data, such as that showing village sites, which impacts the availability of timber*—All data provided to BCFS staff are taken into account as far as possible by the avoidance of areas operationally and by consideration in the timber supply analysis and AAC determination. I am aware that some of this information may be confidential, subject to the *Freedom of Information and Privacy Act*, and for this reason may not be disclosed to BCFS staff or licensees except as the legislation otherwise requires. Earlier I noted an unquantified overestimation in the timber supply on this account, particularly in respect of CMTs and other archaeological sites. The building of a more complete database is leading to a more comprehensive accounting for these values in

analyses. In addition, the management of cultural heritage resource values is a key objective that must be met under FRPA.

- *Request for information relating to forest inventory, historic harvesting and harvest billing, undercut, and potential tenure issuance*—I understand the District Manager has responded to these requests by letter.
- *Will the forecasted harvest reduction affect First Nations' access to tenure?*—This is outside my mandate for consideration under Section 8 of the *Forest Act*, (but I understand from district staff that under FRAs the answer is no).
- *How have timber harvesting activities been affecting traditional territories asserted by First Nations within this TSA?*—The TSR process does not analyze harvesting by asserted traditional territory; however, I can speak to harvest patterns in east and west coast portions of the Strathcona TSA. Historic logging patterns have resulted in declining harvest levels in the Kyuquot area. This will be balanced by increased harvesting in the Sayward area.
- *Have AAC reductions to date resulted from unsustainable rates of harvest and have some areas been more intensively harvested than others, with differing impacts on different First Nations?*—The harvest level reductions to date result not from 'unsustainable' harvesting per se, but from the historical harvesting of long-accumulated volumes of wood in old-growth forests; the area projected to harvested each year under the base case forecast is roughly constant at about 1500 hectares. However, the amounts harvested from different parts of the TSA, including areas with different First Nations' interest, have varied over the years.
- *Sensitivity analysis should reflect treaty land selections*— Even with this information, as noted above in Planning Issues and Land base Adjustments, the eventual implications for timber supply can only be accounted for in an AAC determination when the appropriately authorized, formal decisions have been made and implemented. I am aware that a Part 13 designation has been implemented for the Maa-nulth treaty land selection areas.
- A number of other issues were raised that I believe are more appropriately considered at the operational level and through discussions with the district staff. These issues include: potential locations of operating areas for tenure opportunities under FRAs; concern over the distribution of benefits from timber harvesting in the area; concerns about impacts of forestry operational activities on clam beds and sockeye spawning in Jansen Lake; and a request for the Campbell River Forest District to support a draft consultation protocol agreement between a First Nation and a licensee.

From my discussions with the Campbell River Forest District Manager and his staff, relating to many aspects of First Nations' issues in this TSA, I have reached a general conclusion as follows: operational allowances, in the form of at least temporary avoidance of harvesting in certain areas, are being made on a regular basis to accommodate identified—and in some cases potential—archaeological features and other First Nations' aboriginal interests in the TSA. I have considered interests in *archaeological sites, CMTs and cultural heritage resources* in other sections of the rationale. However, I understand that the full extent of these values and features is unknown, that additional features continue to be discovered, and also that some information is considered confidential by First Nations. In some cases the District Manager is

not made aware of the pertinent arrangements or agreements between licensees and First Nations.

In this case, even when all known archaeological features are taken into account, the full extent of the constraint on timber supply that may reasonably be expected from managing for these as yet incompletely revealed values remains uncertain. This contributes—in an inherently unquantifiable way—to the risk of an overestimation in the timber supply projection, which I have recognized and taken into account in my decision as discussed in 'Reasons for Decision'.

To minimize the associated uncertainty, I again encourage First Nations to share whatever information they feel could contribute to identifying the full nature of the constraint on timber supply that may be expected from the associated cultural values. This issue will be reviewed again in the next timber supply review.

Section 8 (8) (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area:

Alternative harvest flows

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large, long-accumulated volumes of timber in older forests often permits the harvesting of greater volumes each year now than in the long term, without jeopardizing the future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current harvest levels will be compatible with smooth transitions to medium-term and long-term harvest levels. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

For the Strathcona TSA, in addition to the base case forecast, as shown in Figure 13 of the 2004 timber supply analysis report, two alternative harvest forecasts were generated using the same management assumptions as in the base case but under different choices of harvest flow. One forecast showed the mid-term implications of maintaining the current AAC for 20 years. Following two decades at this elevated short-term harvest level, significant disruptions would be experienced in the mid-term timber supply, as managed stands would not be ready for harvest as quickly as required to support the base case projection. In the other forecast, the highest attainable mid-term harvest level was projected as a non-declining yield forecast, at about 870 000 cubic metres per year. However, this required an immediate reduction of 22 percent or 250 000 cubic metres per year from the initial harvest level in the base case. This rapid reduction in harvest required the harvest to be constrained subsequently to this level of 870 000 cubic metres per year, i.e., below the base case mid-term level of 912 000 cubic metres, until decade 15, because stands that were converted to a managed condition earlier in the base case would be converted at a later time under this harvest flow alternative.

In addition to these two forecasts, I have also considered alternative rates of harvest from the Kyuquot Supply Block. All of these forecasts, and the published sensitivity analyses using the base case as a reference, have been helpful to me in this determination. In particular, a sensitivity analysis noted in *cutblock adjacency, forest cover and green-up* showed that, using a spatial modelling approach to simulate unrealistically constrained conditions, the short-term harvest levels projected in the base case could still be achieved for several decades. This indicates additional flexibility in the short-term timber supply, of which I have been mindful in this determination, as noted in 'Reasons for Decision'.

In public input, a member of the public recommended a larger reduction than indicated in the analysis report, toward a sustainable harvest level. However, from my review of the feasible alternative harvest flows, I have concluded that an appropriate range of flow options has been investigated, and that of these, the flow incorporated in the base case is most likely to minimize the likelihood of disruption in the transitions to mid- and long-term harvest levels while providing for the maintenance of environmental values as required by law. As such, I am satisfied that the base case timber supply projection for the Strathcona TSA provides a suitable and adequate basis of reference for my considerations in this determination.

I have further considered the implications to the province of alternative rates of harvest as follows.

- community dependence on the forest industry

The resident population in the Strathcona TSA in 2001 was about 92 000 people, a 1.7-percent decrease from 1996. Most of this population decline occurred in the more resource-dependent towns of Gold River, Tahsis, and Sayward. For the Comox-Strathcona Regional District, which includes the Strathcona TSA, forecasts indicate a population increase of 0.7 percent by 2004.

Between 1995 and 2000, the labour force in the Campbell River Forest District declined overall by about 5 percent. In the same period, direct employment in forestry declined by about 16 percent, while dependence on public sector employment increased (although this was just prior to significant downsizing). In 2001, the most significant employment sectors in this district were: public sector, 34 percent; forest industry, 21 percent; and tourism, 15 percent.

From these figures, forestry clearly plays an important role in the economies of local communities. I am aware that the near-term decline in timber supply, as forecast in the base case projection, if reflected in reduced AACs could have a dampening effect on local economies, but this must be viewed in context of other, in some cases, moderating, conditions. The full AAC of the TSA has not been harvested for some time now, resulting in a significant undercut, such that the full extent of any harvest level reduction might not be felt immediately. While some communities are more highly dependent on forestry, others have diversified and are dependent upon a wider range of economic sectors. North Island communities have already experienced the closure of the Utah Mine at Port McNeill, and the closures of the Gold River pulp mill and the Tahsis sawmill, and some consequent readjustments have already taken place. Other areas, notably Courtenay-Comox and Campbell River are experiencing new development related to tourism and retirement. In this mix of conditions it is difficult to

correlate changes in harvest level in the TSA directly with the overall intensity of local economic activity.

With respect to the environmental implications of alternative rates of harvest, all of the alternative harvest rates examined and published in the timber supply analysis report are consistent with the requirements of the Forest Practices Code and the *Forest and Range Practices Act*. While lower initial rates of harvest might result in greater levels of precaution and protection for biodiversity, as recommended by some in public input, these options must be considered in context of potential disruptions to communities from sudden alterations in harvest levels, in respect of which I am required by the *Forest Act* to give consideration to the social and economic objectives of the government, as discussed under Section 8(8)(d) below.

Section 8 (8) (c) **the nature, production capabilities and timber requirements of established and proposed timber processing facilities:**

This section of the *Forest Act* has been repealed [2003-31-2 (B.C. Reg. 401/2003)]

Section 8 (8) (d) **the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia:**

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4).

This letter and memorandum provide a government view on forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that 'any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.' He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

In the current case of the Strathcona TSA, where a declining timber supply is forecast for the near term, and particularly for the Kyuquot area, from where operations are consequently required to relocate to second-growth stands in the Sayward area, in the interest of community stability I have recommended that licensees' harvesting performance in sites of low productivity and on less stable terrain be monitored to investigate the potential for such harvests to moderate the currently forecast declines. I noted earlier in Silvicultural Systems that while significant areas in the TSA have already been commercially thinned and were accounted for in the analysis for this determination, little or no future commercial thinning is

planned in the TSA, as most eligible stands have either already been thinned or have aged beyond the usefulness of this treatment.

The Minister's memorandum addressed the effects of visual resource management on timber supply, asking that the constraints applied to timber supply to meet VQOs not be allowed to unreasonably restrict the timber supply. This provides me with guidance respecting government's views on the trade-off between the social objective of retaining attractive scenic views and the economic objective of minimizing the associated loss of commercially viable timber. In respect of the management of visual resources in the TSA, I have considered and accounted for a 20 000-cubic metre underestimation in the mid-term harvest level projected in the base case, as discussed in 'Reasons for Decision'.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. The BCFS took a number of steps to provide opportunities for public review through the timber supply review process for the Strathcona TSA. These included public advertisements of, and opportunities to review, the data package and the timber supply analysis, and invitations to respond to a public discussion paper. Six responses, including oral responses, were received from First Nations, five from licensees including one licensee group, and two from individuals. Wherever possible and appropriate to my considerations under Section 8 of the *Forest Act* I have attempted throughout this rationale to respond briefly to the views expressed in the submissions received, and consideration of this material has been helpful in this determination.

Some questions received, that lie outside the range of my statutory considerations—for instance the adequacy of protected areas in the region—I have not addressed. A number of the submissions received related to local social and economic objectives in respect of the apportionment of the harvest subsequent to my determination of the AAC. Questions of apportionment should be addressed to the Minister of Forests and Range, either directly or through the Campbell River Forest District office. Other submissions related to details of the process of technical and analytical review of data, which are best discussed personally with BCFS staff. One noted that 'external factors far outweigh the AAC's impact on this area', and that mill closures in nearby areas have resulted from many causes other than decreased harvests.

Section 8 (8) (e) **abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area:**

Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by such agents as fire or disease, that are not recovered through salvage operations. In regenerated forests, a number of parasites, fungi or plants can kill trees or degrade the quality and value of logs. Estimates for unsalvaged losses account for epidemic (abnormal) infestations and for factors that result in losses that are not recovered through salvage harvest programs and are not recognized in yield

estimates. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or though other methods. Endemic losses associated with second-growth stands are addressed by application of operational adjustment factors (OAFs) as noted earlier under *volume estimates for regenerated stands*.

In the 2004 timber supply analysis report for the Strathcona TSA, *Table A-20* identifies 1750 cubic metres of unsalvaged losses from an annual loss of 2500 cubic metres to fire, and 30 000 cubic metres of unsalvaged losses from a total of 60 000 cubic metres lost to wind-throw or blow-down. These figures are based upon the district's blow-down ledgers, the district's experience with salvage, and the district's fire occurrence records. No other information on these factors is currently available. Ongoing monitoring of insect infestations within this TSA reveals only relatively minor losses that would be accounted for in existing yield models. Key insect species monitored in this district include western black headed budworm, western hemlock looper, balsam woolly adelgid, conifer sawflies and gypsy moth.

Laminated root rot (*Phellinus weiri*) occurs in the drier regions of the district, primarily in younger Douglas-fir forests in the Sayward area, on Quadra Island, and in minor pockets in the Gold River area. Current estimates of annual unsalvaged losses total 11 400 cubic metres. To account for this root rot in the analysis, an operational adjustment factor of 7.7 percent, developed by regional staff, was applied only to those applicable Douglas-fir stands between the ages of 10 and 140 years as noted in the analysis; this reduced the short- and mid-term timber supply by about 20 000 cubic metre per year. The management strategies applied to such stands over the past 10 years are expected to reduce the need for this additional operational adjustment factor in very young Douglas-fir stands and future managed stands.

In the absence of contrary information, I am satisfied that the unsalvaged losses incorporated in the timber supply analysis in conjunction with the adjustments already applied to yield tables are an adequate accounting for the timber supply implications of losses to factors including insect epidemics, fires, wind damage, and root rot.

Reasons for Decision

In reaching my AAC determination for the Strathcona TSA, I have made the considerations documented above, all of which are integral to my reasons for my decision, and from which I have also reasoned further as follows.

The 2004 timber supply analysis base case harvest forecast projected that, under current management, the current AAC of 1.278 million cubic metres could not be maintained if a timely transition to a projected mid-term harvest level of 800 000 cubic metres per year was to be achieved. Instead, an initial harvest level of 1.117 million cubic metres per year was projected, about 13 percent below the current AAC. This was projected to be followed by further reductions of about 12 percent of the current AAC in each of the following two decades, to a mid-term level of 800 000 cubic metres per year after 20 years. After a further 50 years, the harvest level increased by 14 percent, with a further increase of 6 percent 145 years from the beginning of the projection, to a long-term level of 970 000 cubic metres per year.

In determining AACs, my considerations will typically identify factors which, considered separately, indicate reasons why the timber supply may be either greater or less than the harvest levels projected for various periods throughout the base case. Some of these factors can be quantified and their implications assessed with reliability. Others may influence the assessment of the timber supply by introducing risk or uncertainty, but cannot be quantified reliably at the time of the determination and must be accounted for in more general terms.

As detailed in my considerations, I have identified the following factors as reasons why the timber supply as projected in the base case may have been overestimated to reasonably quantifiable degrees.

- **Volume estimates for existing mature stands:** The statistically significant results of the 1999 inventory audit indicate an overestimation of 28 000 cubic metres per year in the short and mid terms of the base case projection.
- **Identified wildlife:** In respect of the designation of WHAs for the management of identified wildlife the base case overestimates the timber supply throughout the forecast period by a little less than one percent of the current AAC, that is, roughly 12 000 cubic metres per year in the short term.

The following factor was identified as indicative of a potential overestimation in the timber supply to a degree that currently cannot be quantified with accuracy:

- **First Nations—cedar, archaeological sites, culturally modified trees, and cultural heritage resource values:** While BCFS district staff advise that First Nations' current needs for cedar for traditional and cultural uses can likely be met, they are uncertain whether the need for cedar trees of adequate size and quality can be met over the long term without additional provision. Also, while CMTs are accounted for both in the field, through avoidance of harvesting or other management practices, and in the analysis, by reflection of this management, the number and exact location of CMTs that remain to be discovered and accounted for is uncertain. This is also true for archaeological sites and cultural heritage resources; even when all known features are taken into account, the full extent of the constraint on timber supply that may reasonably be expected from managing for these as yet incompletely revealed values remains uncertain. This contributes to an inherently unquantifiable risk of overestimation throughout the timber supply projection.

The following factors were identified as reasons why the timber supply as projected in the base case may have been underestimated to reasonably quantifiable degrees.

- **Visually sensitive areas:** While I am satisfied that all reasonably foreseeable constraints on timber supply from managing visual resources in the TSA are adequately represented in the short-term harvest level in the base case analysis, the localized data obtained from slope analysis indicated that visual areas in the Sayward landscape unit are generally on shallower slopes than the rest of the TSA, and will permit slightly higher allowable disturbances and slightly lower VEG heights by recommended VQC than in the rest of the TSA. This indicates a 20 000-cubic-metre underestimation in the projected mid-term harvest level.
- **TFL 47 'take-back' volume:** The five-percent 'take-back' volume from the change of ownership of TFL 47 amounted to an allowable harvest of 26 008 cubic metres per year.

This has been transferred to the TSA from the TFL but was not accounted for in the base case analysis, indicating an underestimation of 26 000 cubic metres per year throughout the forecast period.

- **Roads:** Because the actual productive area lost to existing roads appears to be somewhat less than that modelled in the base case, the projected mid-term harvest level has been underestimated to a small extent, likely less than one percent, which I have estimated to be in the range of 5000 cubic metres per year.
- **Riparian zones:** My considerations of the methodology employed in deriving the land base deduction attributable to management and retention in riparian zones have identified an underestimation of roughly 7.5 percent in the THLB derived for the base case. This corresponds to an underestimation of about 84 000 cubic metres per year in the projected short-to-mid-term harvest levels.
- **Minimum harvestable ages:** The forthcoming increase in harvesting in the Sayward area, which is planned in conjunction with reduced operations in the Kyuquot area, will be able to take advantage of the temporary operational availability of second-growth stands at ages lower than assumed in the base case analysis. From my discussions with BCFS district and analytical staff I have identified the consequent availability of 30 000 cubic metres per year in addition to the harvest projected for the first decade in the base case, by taking immediate advantage of just some of the identified additional flexibility otherwise available in the mid term, without necessitating any revision to the projected long-term harvest.
- **Site indices:** Site productivity values based on data from the TEM and SIBEC estimates indicate a probable underestimation of 160 000 cubic metres per year in the long-term harvest level projected in the base case forecast.

In reviewing the implications for the timber supply resulting from the above list of conclusions taken in combination, I note the following.

The quantified *over*estimations in respect of the management of identified wildlife (roughly 12 000 cubic metres per year) and of the volume estimates for existing mature stands (about 28 000 cubic metres per year) add to a total of about 40 000 cubic metres per year. Both of these act in the short and medium terms (and in the case of wildlife, in the long term).

The quantified *under*estimations acting in the short or the mid term include those in respect of: visually sensitive areas (20 000 cubic metres per year, mid term); the TFL 'take-back' (26 000 cubic metres per year, all periods); roads (5000 cubic metres per year, mid term); riparian zones (84 000 cubic metres per year, short and mid terms); and minimum harvestable ages (30 000 cubic metres per year for the first decade). The underestimation attributable to site indices (160 000 cubic metres per year) affects the long term only. Of these underestimations, those which act specifically in the short term are attributable to: the TFL 'take-back'; the riparian zones; and the minimum harvestable ages. In combination, these three factors produce a total underestimation in the base case of about 140 000 cubic metres per year in the short term.

Taken together, the identified *over*estimations (40 000 cubic metres per year) and the identified *under*estimations (140 000 cubic metres per year) affecting the projected short-term timber supply indicate a combined overall net *under*estimation of roughly 100 000 cubic

metres annually in the initial harvest level projected in the base case forecast. That is, when the factors affecting the validity of the initial harvest level projected in the base case forecast are taken into account in combination, they indicate that the timber supply could actually support a projected short-term harvest level approximately 100 000 cubic metres per year higher than the level of 1 117 000 cubic metres per year projected in the base case.

Before accepting this conclusion, two other factors must be reviewed. First, an unquantified risk to the timber supply was identified in respect of First Nations' needs for cedar, as well as archaeological sites, culturally modified trees, and cultural heritage resource values. The total number of hectares involved is expected to be fairly small relative to the overall area of the THLB, and some of these values may be adequately accommodated—at least in the short term—in combination with WHAs, riparian areas, and provisions for other objectives. In addition, sensitivity analysis indicated that there is flexibility in locating the short-term timber supply operationally, which could be helpful in dealing with emerging requirements such as may be expected from managing for First Nations' cultural heritage values. Specifically, the sensitivity analysis discussed in *cutblock adjacency, forest cover and green-up* and in Alternative Rates of Harvest shows that the short-term harvest levels projected in the base case could still be achieved for several decades under a spatial modelling approach that simulated unrealistically constrained conditions. For the longer term, however, the extent of this risk requires better evaluation; therefore, as I have noted earlier and in my 'Implementation' section, I reiterate that I encourage licensees and First Nations to cooperate in providing all information that may be helpful to completing a better analytical assessment of any associated risk to future timber supply projections. Second, in my considerations I have also noted the potential for licensees to offset potential timber supply shortfalls to some degree by showing more harvest performance in areas with less stable terrain or with lower stand volume and value, or through management in riparian areas. As new information becomes available over time to clarify both (a) the full extent of the area involved in new discoveries of First Nations' aboriginal interests and cultural heritage resources, and (b) industry's ability to harvest in an environmentally sound manner on the identified areas, the net effect of these two mutually offsetting potential influences on timber supply can be evaluated. In the absence of more comprehensive information, for the current determination I consider it reasonable to conclude from the foregoing that the immediate implication of neither of these factors is of a sufficient magnitude to jeopardize my conclusion on the size of the net, overall underestimation in the base case as derived in the preceding paragraphs.

In *current inventory*, I noted that the date of this determination is approximately four years after the starting date of the base case forecast, leaving a further six years of the first decade projected at the initial harvest level, and that the initial harvest level projected in the base case could therefore still be maintained for one year more than the five-year effective period of the AAC I am now determining. While the same conclusion may not be self-evident for a harvest level set 100 000 cubic metres per year above the base case initial harvest level, the conclusion is reasonable because the identified net underestimation in the short-term timber supply, as projected in the base case, applies throughout the first two decades, of which 16 years still remain, with further underestimations identified for the mid term. I am therefore confident that the remaining inventory will be able to support the new AAC for its five-year effective period without compromising the mid-term supply.

One more important factor for consideration is the harvest profile. If the current proportional underutilisation of hemlock stands on the THLB were to continue, at some point this would become a cause for concern that the operability mapping in the TSA ought to be reviewed. For this reason, in my 'Implementation' section I have recommended continuing the monitoring of the harvest profile in the TSA, with a view to providing more comprehensive information for use in the next determination.

From all of the above reasoning, I am satisfied that the timber supply in the Strathcona TSA is sufficiently resilient to accommodate a harvest level established at 100 000 cubic metres per year above that projected in the base case, for the five-year effective period of this AAC, without compromising future productivity or jeopardizing projected harvest levels in any way. A harvest at this level is consistent with responsible stewardship, minimizing instability into the currently projected controlled declines in harvest level, and helps to bridge the period until new inventory and site index information can be compiled and analysed in support of new timber supply projections.

I have noted earlier that in respect of the proposed protected areas under the CCLRMP, parts of the TSA have been specified by government as designated areas under Part 13 of the *Forest Act*. The Minister of Forests suspended harvesting in these areas on February 27, 2005, by written order under Section 170. The total area so designated within Strathcona TSA is 2840 hectares. The area covers 857 hectares (0.6 percent) of the timber harvesting land base, and 401 hectares (0.7 percent) of mature timber on the timber harvesting land base. I will consider this information along with the outcome of associated First Nations consultation in making a decision on whether and by how much to reduce the AAC in light of the Part 13 designations. I will issue a separate order under Section 173(2) of the *Forest Act* when I make my decision.

The Maa-nulth First Nations (Ka:yu:'k't'h'/Che:k:tles7et'h', or Kyuquot/Checlesaht, in the Campbell River Forest District) and Sliammon First Nation are currently as Stage 5 of the 6-stage treaty process. I also noted earlier that the government has recently made a formal offer of treaty lands to the Maa-nulth First Nations, which includes area within the Strathcona TSA. The treaty settlement lands have been specified as a designated area under Part 13 of the *Forest Act*. The Minister of Forests suspended harvesting in the area on April 15, 2005, by written order under Section 170 of the Act. Within the Strathcona TSA, the Maa-nulth Designated Area covers about 2850 hectares (1.8 percent) of the THLB, and about 1.3 percent of the mature timber on the THLB. I will review the timber supply implications of the harvest suspension along with the outcome of associated First Nations consultation as soon as possible, and if necessary make an adjustment to the AAC by separate order under Section 173(2). Further, in accordance with my guiding principles, if a treaty is signed during the five-year effective period of this determination, formalizing the removal of these lands from the TSA, I will if necessary revisit this AAC determination at an earlier date than required by statute.

Conversely, if new inventory information indicates the potential for a substantial upward revision in the projected timber supply in the short term, I will also be prepared if necessary to revisit this AAC determination at an earlier date than required by statute.

In conclusion, I note that the making of this determination has clarified for me the need to reconcile certain assumptions respecting the approval of and accounting for undercut volumes in relation to the inventory information on which AAC determinations are based.

Specifically, as noted earlier under *current inventory*, in recent years the AAC has not been fully harvested by licensees in the Strathcona TSA, resulting in an undercut of approximately 360 000 cubic metres in the TSA. In order to create economic opportunities, provincial legislation allows the Minister of Forests to approve the harvest of undercut timber volumes in subsequent cut-control periods. In the present case of the Strathcona TSA such an approval could result in the harvest of up to 360 000 cubic metres in addition to the AAC I am determining here. However, the base case timber supply projection I am using as a reference for this AAC determination includes this 360 000 cubic metres of timber inventory as part of the harvest forecast. If all, or a portion, of the undercut volume is subsequently approved for harvest, this would increase harvest pressure on a land base that already has limited timber availability, consequently decreasing the projected mid-term timber supply. The utilization of this undercut therefore presents an impediment to achieving good stewardship in this TSA.

For these reasons, although the utilization of undercut volumes is generally permissible by statute, in this case the undercut volume is in reality supporting the harvest forecast upon which the new AAC determination is based and I therefore caution against the issuing of licences to harvest the undercut volume. If licences are in fact issued for this purpose, I will ensure that whatever commitments have been made are taken into consideration in the next timber supply analysis and AAC determination.

From all of the above reasoning and in mindfulness of all of the factors I have identified and considered, it is my conclusion that the requirements of Section 8 of the *Forest Act* are most suitably and fully addressed at this time by the determination of an AAC for the Strathcona TSA at a level of 1.217 million cubic metres.

Having made this determination, in view of the potential risk to the short-term supply that may arise from forthcoming decisions by other authorities, I reiterate my commitment to return if necessary to redetermine this AAC before the statutorily required period is complete.

Determination

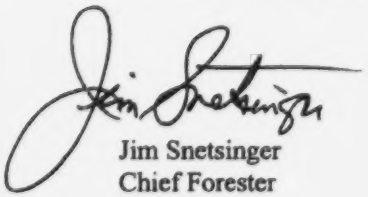
Having considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided, it is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the TSA by establishing an AAC of 1.217 million cubic metres.

This determination is effective August 1, 2005, and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination. This determination is exclusive of temporary reductions for proposed protected areas and treaty land selections which I will issue under a separate order under Section 173(2) of the *Forest Act*.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff and licensees to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability to undertake these projects is dependent on available staff resource time and funding; however, these projects are important in helping to reduce the risk and uncertainty associated with key factors that affect the timber supply in the TSA.

- Licensees and First Nations should make every effort to share with BCFS district staff any information or data potentially helpful in assessing the implications for timber supply that may reasonably be expected from management for First Nations archaeological and cultural heritage resources. In particular, I encourage licensees and district staff to work cooperatively to resolve and quantify as well as possible, for the next analysis, a more refined estimate of the impact on timber supply to be expected from managing CMTs.
- Licensees and BCFS district staff should collaborate in monitoring and demonstrating the potential for harvesting in an environmentally sound manner in areas with less stable terrain or with lower stand volume and value, or through riparian area management or flexibility in minimum harvestable ages.
- In view of the current proportional underutilisation of hemlock stands on the THLB, licensees and BCFS district staff should continuing monitoring the harvest profile in the TSA to provide more comprehensive information for use in the next determination.
- In the interests of good stewardship and of reducing uncertainties in timber supply analysis, I encourage staff of the Ministry of Environment to expedite the process of designating Wildlife Habitat Areas in this TSA.
- I invite and encourage licensees, as they proceed to take a lead role in timber supply analysis in the Defined Forest Area Management (DFAM) process, to maintain integrated communication with the Forest Service at all stages of the process, and particularly with respect to any new inventory information indicating the potential for a substantial upward revision in the projected timber supply in the short term.



Jim Snetsinger
Chief Forester

July 28, 2005

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, c. 157 Consolidated to December 4, 2004, reads as follows:

Allowable annual cut

8 (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest agreement areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to
  (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and
  (b) different types of timber and terrain in different parts of private land within a tree farm licence area.
  (c) Repealed. [1999-10-1]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine an allowable annual cut for each community forest agreement area, in accordance with
  (a) the community forest agreement, and
  (b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider
  (a) the rate of timber production that may be sustained on the area, taking into account
    (i) the composition of the forest and its expected rate of growth on the area,
    (ii) the expected time that it will take the forest to become re-established on the area following denudation,
    (iii) silviculture treatments to be applied to the area,
    (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
    (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
    (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
  (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
  (c) Repealed. [2003-31-2 (B.C. Reg. 401/2003)]
  (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and
  (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (Consolidated to June 20, 2003) reads as follows:

Purposes and functions of ministry

4 The purposes and functions of the ministry are, under the direction of the minister, to do the following:
(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water,

outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia;

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: List of written submissions received

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
Ministry of Forests
OFFICE OF THE MINISTER

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis.*

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

Appendix 5: List of Public Submissions Received

First Nations

Kyuquot/Checlesaht First Nation
Hamatla Treaty Society
Qualicum First Nation
Ehattesaht First Nation
Kwakiutl District Council

Forest Industry

Hecate Logging Ltd
Price, Huber & Associates Inc, for 'a group of Strathcona Licensees'
TFL Forest Ltd., Johnstone Strait Operation
Western Forest Products Inc.
Weyerhaeuser

General Public

2 individual submissions